Raytheon

Software Continuous Technology Refresh Product Improvement Plan

Version 4

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Record of Changes

Version	Effective Date	Section(s) Affected	Page(s) Affected	Description of Changes
1	June 12, 2006			Original
2	Oct. 24, 2006	Cover, Header, Footer	All	Updated version #, submission date, Document Number
		Record of Changes	iv	New
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		1. Background; 2. Strategy; 3. AWIPS II Architecture; 4. Project Management	1-3, 7-10, 17-21, 27-28, 30	Text deletions, additions, changes. Modification of Figures 2-1, 2-2, 3-8, 3-9, and 4-1
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		8. Transition to O&M	38	New
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Version	Effective Date	Section(s) Affected	Page(s) Affected	Description of Changes
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4 (Draft)	Dec. 19, 2008	10 Transition to O&M		Major update
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4	Feb. 24, 2009	2.4 Roadmap		Major update
4	Feb. 24, 2009	Section 3 preamble		Added reference to architecture briefing
4	Feb. 24, 2009	3.4 Key AWIPS II Features		Updated Table 3-1. Updated CAVE para.

Version	Effective Date	Section(s) Affected	Page(s) Affected	Description of Changes
4	Feb. 24, 2009	3.5 AWIPS II Implementation Approaches / Features		Updated Table 3-2.
4	Feb. 24, 2009	6.2 Migrated Task order Summary Descriptions		Added preamble. Updated description of TO11.
4	Feb. 24, 2009	6.3 Special Topics		Updated responses.
4	Feb. 24, 2009	6.4 Local Applications		Major updates.
4	Feb. 24, 2009	6.5 Documentation		Major updates.
4	Feb. 24, 2009	6.5 TTR/DR Processing Coordination		Major updates.
4	Feb. 24, 2009	7. AWIPS I Baseline Software Migration Risks		Major updates.
4	Feb. 24, 2009	Appendix A. AWIPS Software CTR Deployment and Transition Planning: Task Order Outbrief		Added Appendix A.

Acronyms and Abbreviations Used in This Plan

ADE	AWIPS Development Environment
AE	AWIPS Evolution
AELC	AWIPS Evolution Leadership Committee
AFP	Application Focal Point
ASM	Application Support & Maintenance
AIFM	AWIPS Integration Framework Manual
AWC	Aviation Weather Center
C&A	Certification and Accreditation
AWIPS	Advanced Weather Interactive Processing System
CAVE	Common (AWIPS) Visualization Environment
CLI	Command Line Interface
CM	Configuration Management
CMP	Configuration Management Plan
CONOPS	Concept of Operations
COTS	Commercial-Off-The-Shelf
CP	Comms Processor
CPU	Central Processing Unit
CSCI	Computer Software Configuration Items
CTR	Continuous Technology Refresh
CVS	Concurrent Versions System
D2D	Display 2-Dimensional
DCS	Design Change Specification
DMZ	Demilitarized Zone
DR	Discrepancy Report
DTP	Deployment and Transition Planning
EDEX	Electronic Data Exchange System
ENV	Environment
ESA	Electronic Systems Analyst
ESB	Enterprise Service Bus
FEWS	Flood Early Warning System
FFP	Firm Fixed Price
GFE	Graphical Forecast Editor
GIS	Geographical Information System
GSD	Global Systems Division
GUI	Graphical User Interface
HMI	Human Machine Interface
HQ	Headquarters
HTTPS	Hypertext Transfer Protocol Secure
ICD	Interface Control Documents
IDE	Integrated Development Environment
IHFS	Integrated Hydro Forecast System
IMET	Incident Meteorologist
IMP	Integrated Master Plan
IMS	Integrated Master Schedule

I/O	Input/Output
IRAD	Internal Research and Development
ISC	Inter-Site Coordination
IT	Information Technology
ITO	Information Technology Officer
IV&V	Independent Validation & Verification
IWT	Integrated Working Team
JMS	Java Messaging Service
JVM	Java Virtual Machine
LA	Local Application
KAP	Knowledge Acquisition Process
LDAD	Local Data Acquisition and Dissemination
MDL	Meteorological Development Laboratory
METAR	Meteorological Aviation Report
MHS	Message Handling System
MPLS	Multi-Protocol Label Switching
NAS	Network Attached Storage
N-AWIPS	NCEP-Advanced Weather Interactive Processing System
NC	National Center
NCF	Network Control Facility
NCEP	National Centers for Environmental Prediction
NCLADT	National Core Local Applications Development Team
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
NWSTD	National Weather Service Training Division
O&M	Operations & Maintenance
OB	Operational Build
OHD	Office of Hydrologic Development
OMA	Omaha
ORION	One Raytheon Integrated On-demand Network
ORPG	Open RPG (Radar Product Generator)
OSIP	Operations and Services Improvement Process
OST	Office of Science and Technology
OTE	Operational Test and Evaluation
PIP	Product Improvement Plan
PIPT	Partnership Integrated Product Team
PIT	Pre-Integration Test
PMP	Program Management Plan
POC	Point of Contact
QAP	Quality Assurance Plan
R&D	Research and Development
RAMP	Risk Assessment and Management Planning
RAOB	Radiosonde Observation
RCP	Rich Client Platform
RDBMS	Relational Database Management System
RFC	River Forecast Center

RFS	River Forecast System
RHEL	Red Hat Enterprise Linux
ROM	Rough Order of Magnitude
RRD	Risk Reduction Demonstration
RTF	Rapid Test Feedback
RTM	Requirements Traceability Matrix
SBN	Satellite Broadcast Network
SDK	Software Developers Kit
SDP	Software Development Plan
SEC	Systems Engineering Center
SEDA	Serial Event-Driven Architecture
SEMP	System Engineering Management Plan
SHEF	Standard Hydrological Exchange Format
SIT	System Integration Test
SLA	Service Level Agreement
SMM	AWIPS System Manager's Manual
SMS	Software Maintenance and Support
SLOC	Software Lines of Code
SOA	Service Oriented Architecture
SOP	Standard Operating Procedures
SREC	Software Recommendation and Evaluation Committee
SSDD	AWIPS System/Subsystem Design Description
SSL	Secure Sockets Layer
SW	Software
SW CTR	Software Continuous Technology Refresh
SWIT	Software Integration and Test
TAF	Terminal Aerodrome Forecast
TCO	Total Cost of Ownership
TIM	Technical Interchange Meeting
TO	Task Order
TT	Trouble Ticket
TTR	TestTrack Report
UM	AWIPS User's Manual
TP	Test Plan
UFT	User Functional Test
URI	Universal Resource Identifier
VTEC	Valid Time Event Code
URL	Uniform Resource Locator
WAN	Wide Area Network
WBS	Work Breakdown Structure
WFO	Weather Forecast Office
WSO	Weather Service Office
WX	Weather
XML	eXtendible Markup Language

1. Introduction

The focus of this update (version 4) to the AWIPS Software Continuous Technology Refresh Product Improvement Plan (PIP) *is on Deployment and Operations & Maintenance (O&M) Transition. Therefore, changes to Sections are forward looking, and no revisions have been made to the PIP for historical accuracy. Please refer to the "Record of Changes" in the front matter of this document a list of specific changes made.*

1.1 Background

In 2004, the National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) conducted a "present state" analysis of the Advanced Weather Interactive Processing System (AWIPS). The analysis raised several issues related to AWIPS software and indicated that AWIPS' ability to support the future NWS mission was at risk. The analysis also pointed to a growing backlog in the development of new science capabilities, including data types, and raised concerns about the lengthy and tenuous Operational Build (OB) installation process. The ultimate conclusion was that AWIPS "software was in critical need of improvement." Moreover, no Product Improvement Plan existed to address this critical need. NOAA presented the results of the AWIPS present state analysis to Raytheon during the Due Diligence period that preceded the submission of proposals to support AWIPS Operations and Maintenance (O&M). Based on the information provided during the presentation and on our own follow-up research, Raytheon proposed to make several improvements to the overall AWIPS software development and release processes – all of them predicated on migrating AWIPS software to a modern Services Oriented Architecture (SOA). Raytheon's proposal, which resulted in the award of Contract DG133W-05-CQ-1067 in August 2005, included an offer to develop and produce a Software Product Improvement Plan (PIP) as the first step of the migration. This document constitutes that plan, which we will execute under contract Option 1, AWIPS Continuous Technology Refresh (CTR). The CTR option includes hardware, software, and telecommunications.

The following terms, all of which are used frequently throughout the PIP and elsewhere, require definition to avoid confusion.

- *Software Continuous Technology Refresh (SW CTR)* refers to the project described in this Product Improvement Plan, and is focused on the migration of AWIPS baseline software.
- *AWIPS II* refers to the migrated AWIPS system.
- *AWIPS Evolution* (AE) refers to the overall evolution of AWIPS, including software, hardware, and communications. *AWIPS Evolution* also refers to the functional organization of the Raytheon AWIPS Program that is concerned with the Continuous Technology Refresh of AWIPS. Each encompasses the same scope.

1.2 Purpose of the Product Improvement Plan

The purpose of this Software CTR Product Improvement Plan (PIP) is to document and formalize the multiyear SW CTR project. The PIP describes the AWIPS Software Architecture target state and the plan to realize that state. It accounts for more current and complete information than was available for proposal preparation.

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The PIP will provide a mechanism for communicating project scope, objectives, and details to the sizable and widely dispersed community of AWIPS stakeholders. These stakeholders will share ownership of the PIP with the NWS AWIPS Program and Raytheon, and will have both visibility into the plan and the ability to provide feedback at any time.

The PIP will associate the SW CTR plan with other events – Operational Builds, the Operations and Services Improvement Process (OSIP), other AWIPS system infrastructure changes (e.g., network, hardware), and Science and Technology – in order to provide a larger context and enable synchronization with related efforts.

PIP updates will be issued, as required, to keep the Plan current. If appropriate, the updates may be released as Task Order deliverables. If material new information is discovered, or if conditions change, the Plan can change to accommodate it.

The PIP identifies and describes tasks at a Master Plan or Strategy level of detail. Project specifics, such as detailed schedules, will be provided in individual Task Orders. Technical briefings, software demonstrations, training materials, source code, and documentation were delivered to the NWS with Task Orders 3, 4, 5, and 6. Other briefings have been given to the NWS as well (e.g., Corporate Board). Individuals desiring more detailed information are encouraged to review this material. Jason Tuell (301.713.1809 x. 112) and Ronla Henry (301.713.0211 x. 140) are Points of Contact for this information.

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2. Strategy

2.1 Key Requirements / Needs

System-Level Requirements/Needs. The existing end-user functionality of AWIPS appears to be comprehensive and adequate for current needs. Of concern to NWS, however, are the cost, complexity, and rapidly increasing difficulty of extending AWIPS' functionality to meet the future mission of NWS and adapt to evolving end user and consumer requirements. NWS cited several system-level issues during the Due Diligence presentation on the "AWIPS Present State Analysis." Those issues are the basis for the following list of major system-level requirements / needs:

- Improved adaptability to accommodate new science, new data types, and a changing CONOPS (to include new requirements in interagency collaboration).
- Maximum use of Open Source software vs. licensed Commercial-Off-the-Shelf (COTS) and proprietary software.
- Platform independence (hardware, operating system, database).
- Improved reliability, availability, and supportability.
  - Reduced Discrepancy Reports (DR).
  - Faster fix cycles.
- Improved performance, scalability (up and down), and load balancing.
- Improved flexibility.
- Simpler software build and deployment framework.
- Streamlined installation process, including application releases.
- Consistent user interfaces across applications (includes applications of Weather Forecast Offices (WFO), River Forecast Centers (RFC), and the National Centers for Environmental Prediction (NCEP).
- Improved software consistency across independent developers.
- Improved support for including local applications in site installations.
- Standard development environment for all developers.
- Improved compliance with standards.

As we meet these system-level requirements, current end-user functionality and desirable traits must be preserved. Moreover, the functionality of AWIPS will change while the development of, and migration to, the new architecture is occurring. Therefore, the system needs to preserve the then-current functionality of the baseline Operational Build.

Functional Requirements. During Technical Interchange Meetings (TIM) with representatives of numerous NWS development and operational groups, several critical functions of the legacy applications were noted. These include:

- ***N-AWIPS*** (render large data sets, interactive and automated product production, extensive grid diagnostics, on-the-fly ad-hoc calculation, drawing, pan, and roam).

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- ***AWIPS*** (rendering performance, precise forecaster interaction with the data, warning performance, data event performance, and radar analysis).
- ***GFESuite*** (accurate forecast generation, forecaster-optimized digital forecasts, graphical harmonized editing of digital forecast, forecast product generation, local customization and extensibility, and Python support).
- ***Hydro*** (water shed modeling, graphical interaction with modeling and gauge data, and warning performance).

New capabilities will be developed using a Software Developers Kit (SDK) within an AWIPS Development Environment (ADE). The ADE/SDK must support developing capabilities that are beyond the current baseline (OB6). For example, D2D (i.e., AWIPS' two-dimensional data display) does not currently provide drawing capability. The ADE/SDK should provide the means for the application developer to add this functionality easily.

Specific extensions beyond current capability to be supported by the architecture include:

- A Common (AWIPS) Visualization Environment (CAVE) merging D2D, N-AWIPS, FX-net, FX-C, GFE (Graphical Forecast Editor), Hydro Applications.
- Forecaster collaboration/briefing (e.g., supporting functionality similar to FX-C).
- Thin Client access to data (e.g., supporting functionality similar to FX-net).
- GIS (Geographical Information System) data capability.

Subsystem Remediation Requirements. Several problem areas within the present-state AWIPS can be corrected only by architecture changes and are therefore beyond the scope of corrective maintenance. These requirements include:

- Improved Notification Server capability.
- Improved Satellite Broadcast Network (SBN) ingest capability.
- An installation rollback capability.
- Support for improved/updated LDAD (Local Data Acquisition and Dissemination) CONOPS.

Non-Technical Requirements. Finally, non-technical requirements need to be addressed. One such requirement is the need for expedient execution. The new system is needed as quickly as it can be made available without incurring undue program risk or operational disruption. This requirement has influenced the approach to realization. Another requirement that significantly influenced our general approach to managing the project is the requirement that Raytheon support the AWIPS O&M contract on a Firm Fixed Price (FFP) basis. Our approach for meeting the FFP requirement is discussed in the next section.

2.2 Task Order Management Approach

NWS has expressed a strong desire to execute SW CTR on an FFP basis. However, large-scale FFP development projects of significant duration pose risks for the contractor and the customer. For example, the information known at the time the cost proposal is prepared is limited, virtually guaranteeing a "less than perfect" cost projection. Cost increases are commonplace, whether the contract is Cost Plus or FFP. Shutting down large programs is difficult. Additionally, the longer a

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project's duration, the more likely it is that the conditions that formed the basis of the project plan will change during the period of performance. Customer functional requirements, along with technical and business drivers, change over time. Changing conditions are problematic for FFP contracts.

All of these issues can be managed, but their general effect is that additional time and money are spent dealing with contract issues while the technical program may remain in suspension pending resolution of programmatic concerns. To avoid the pitfalls of a large-scale, long-term FFP project, Raytheon proposed an approach that provides the necessary requirements flexibility while also providing a means to control cost and schedule effectively: *Develop a Program Plan that provides a project roadmap and overall cost estimate. Then decompose the project into relatively small, well-defined, and rapidly executed Task Orders resulting in specific, value-added deliverables.*

Smaller tasks are typically shorter in duration than large-scale projects, and estimates of schedule and cost are generally more accurate, with less risk to contractor and customer. In light of these considerations, Raytheon has developed a SW CTR plan that incorporates a series of small, well-focused tasks, each of which provides value-added deliverables and incremental improvements against previous Task Orders (TO). The end result of these TOs is a new, Service-Oriented AWIPS II capable of supporting the flexibility, adaptability, and extensibility desired by NWS.

This PIP describes the TOs in enough detail to enable readers to understand their purpose, schedule, and intended results; it does not describe the details of each TO as those will be provided in each discrete TO proposal. The Plan is based on current information. As conditions change, the Plan will be, and has been, adjusted to account for the change. Note that during the execution of any given TO, the very next TO(s) to be executed is/are proposed and priced. These TOs will be funded as FFP projects, with detailed performance schedules and well-understood deliverables. Changes to the Plan may include new TOs, changes to TO descriptions, or removal of TOs. These changes occur under management oversight and are recorded in the PIP. This approach mitigates cost and schedule risks, and avoids the overhead associated with contract modifications.

A TO approach to SW CTR also provides "off-ramps" for the Weather Service. If for any reason NWS decides to abort the project, it can end the work simply by not funding the next TO – again avoiding the overhead associated with contract modifications and the risk associated with monolithic programs.

A TO approach to performance, however, introduces two additional risks, both of which need to be mitigated. The first risk is project drift. It is conceivable that when focusing on the near term, changes to the plan can take it off course, or that issues might be missed altogether in developing subsequent TO plans. This risk is mitigated by undertaking periodic PIP reviews and updates. Second, we risk incurring time gaps between TOs because of delays in generating TO proposals or acquiring customer approval. Our general approach is to submit a proposal for the next TO prior to completing the active TO, allowing sufficient time for the customer's review and approval. Overall program reviews keep the principals current; this in turn helps maintain the timeliness of TO proposals and approvals.

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2.3 Approach to Re-Architecture

AWIPS' current architecture is circa early to mid-1990s, and is composed of approximately 4.5 million SLOC (source lines of code). A slow migration with coexisting new and old architecture elements would take too long and is likely to cause significant disruptions to operations. Raytheon looked instead for an approach to realizing the new AWIPS software that would bring about the most expedient migration of AWIPS at the lowest risk of operational disruption.

Our general approach is to perform a "black-box" conversion, which will consist of replacing the AWIPS "internals" while maintaining the outward appearance and forecaster functionality of today's AWIPS. The AWIPS baseline system will be completely converted off-line, thus avoiding operational disruption. The system will be thoroughly tested, validated, and accepted by field operations before deployment. This includes testing of local applications. As previously stated, the deployed system will be current with its contemporary, deployed OB (~9).

We "jump started" the conversion by utilizing results of Raytheon Internal Research and Development (IRAD). These results represent approximately five years of related research and development.

The approach for future AWIPS development is as follows:

- Raytheon develops the "infrastructure" code (services).
- Raytheon develops and provides an AWIPS ADE that includes an SDK.
- ADE/SDK is provided freely to NWS and its partners.
- Labs/Centers produce new forecaster and weather application functionality (i.e., "new science") using the ADE/SDK.
- Local application developers use the ADE/SDK.

2.4 Roadmap

This section discusses the steps required to realize the new system (i.e., "AWIPS II"), and includes two roadmap views. The first view (Figure 2-1) summarizes ADE development during the first 15 months of Task Order performance. The second view (Figure 2-2) shows the updated overall roadmap of the project.

Figure 2-2 shows the updated detail and refinement of the deployment and O&M transition tasks. It includes a "pre-OTE (Operational Test and Evaluation) Testing" task, which is new for this version of the roadmap. Pre-OTE Testing software support has been incorporated into TO11 , and as a result the TO performance period will be longer in duration than previously planned. Figure 2-3 depicts the new conceptual approach to TO11.

O&M Transition tasks start earlier than in the previous version (3) of this Product Improvement Plan. See the detailed roadmap and discussion in Section 10. Training tasks explicitly show Application Focal Point training and current NWS Training Division (NWSTD) plans. A new task, "Site Migration," was added to the roadmap to reflect activities needed to prepare the Sites to become operational using AWIPS II. Section 9 includes a discussion on Site Migration activities. As before, the deployment task is for Sites that were not included in OTE.

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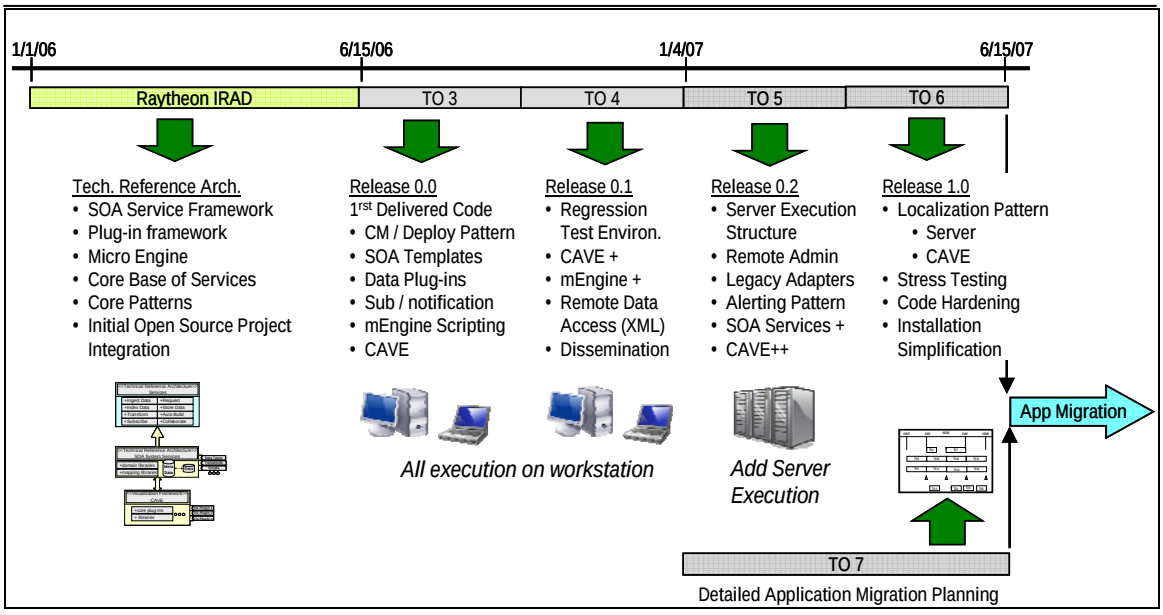

Figure 2-1. ADE Release Content

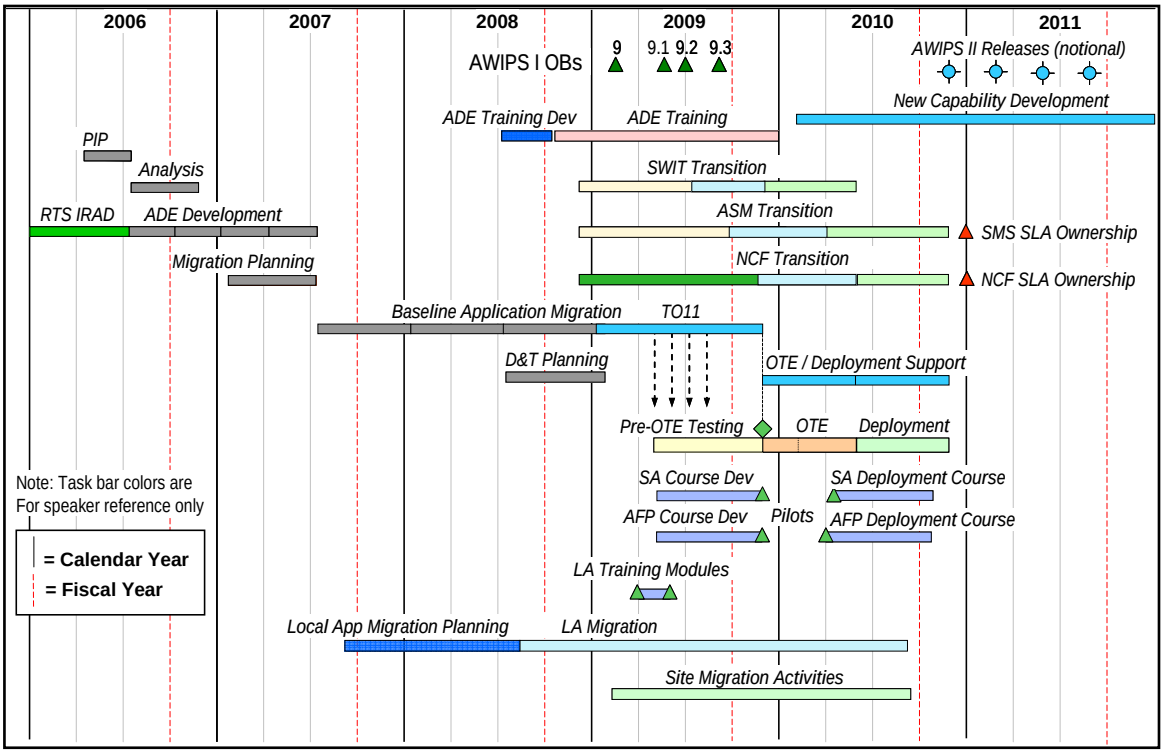

Figure 2-2. SW CTR Overall Roadmap

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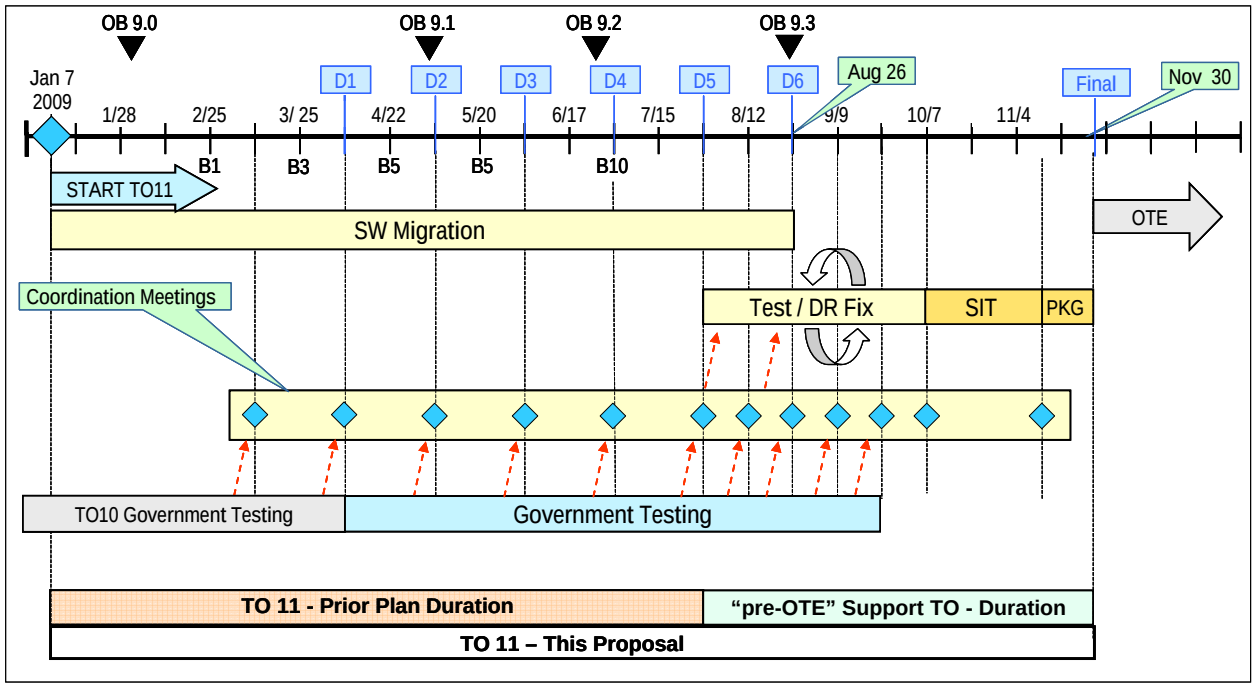

Figure 2-3. TO11 Conceptual Approach

Figure 2-3, which depicts the proposed conceptual approach to TO11, shows a start date of January 7, 2009, and an end date of November 30, 2009. The major characteristics of the TO11 approach are the following:

- Six interim deliveries and one final TO11 delivery.
- OB System Integration Test (SIT) in Omaha for each interim delivery.
- More detailed proposal for delivered capabilities.
- More and frequent project coordination meetings.
- Resources included to resolve DRs.
- OB SIT procedures that provide criteria for Task Order completion (specific detailed OTE entrance criteria is to be determined at the time of proposal submittal).

Interim deliveries (i.e., D1…D6) contain complete testable functions ready for pre-OTE testing, and are explicitly defined in the TO11 Technical Proposal, which is currently in review. These deliveries will allow more overall time for pre-OTE testing than would be possible if everything were delivered at the end of a task order. Note that the task order activity began in early January even though there was no Task Order Authorization at that time. Note that the OB items shown in Figure 2-3 refer to the Readiness Review for each release. A more specific and detailed description is provided with the Technical Proposal.

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3. AWIPS II Architecture

While some details have changed, the fundamental conceptual architecture remains the same. A 100-slide presentation on the current state of the architecture has been expanded and updated with each SW migration task order; the current version was delivered under TO10 in February 2009 (file name: ADEarchTO10.pdf). The reader is directed to that presentation for the detailed current state of the architecture.

3.1 Introduction

Future Weather Service missions require a new AWIPS software architecture. A *fundamental* driver for the new architecture is the National Weather Service's desire to utilize *Open Source* software instead of COTS or proprietary software. Taking this approach, NWS will realize significant savings on license fees and the administrative costs of negotiating and administering software licensing and distribution versus using commercial software (e.g., COTS). Even while realizing these savings in license costs, NWS will benefit from substantial code reuse and the ability to incorporate new Open Source software and enhancements as they become available.

Over the last ten years, Open Source software has become a viable alternative to expensive COTS software. By utilizing Java-based Open Source software, NWS can achieve a significantly lower Total Cost of Ownership (TCO) and improved programmer productivity due to reuse.

This section reviews several aspects of the new AWIPS architecture. In keeping with Raytheon's current task, which is to provide a *plan* rather than a design or an implementation, the review has been prepared at a high level. This discussion describes the target state for improving AWIPS software.

The concepts and design constructs presented here will be detailed and implemented under Task Orders 3 through 6, as described in Section 2.5.

3.2 Conceptual Architecture: Target State

Figure 3-1 shows a rendering of the conceptual architecture for AWIPS as a *layered* model. Generally, higher-level services access services in the next lower layer of the hierarchy. Layers are *isolated* from one another. The top layers provide the common human-machine interface and presentation services, which access mission services. Mission services access data at the platform layer via a *data access layer*. The layers interconnect through standard network services, and security services cut across all the layers of the architecture.

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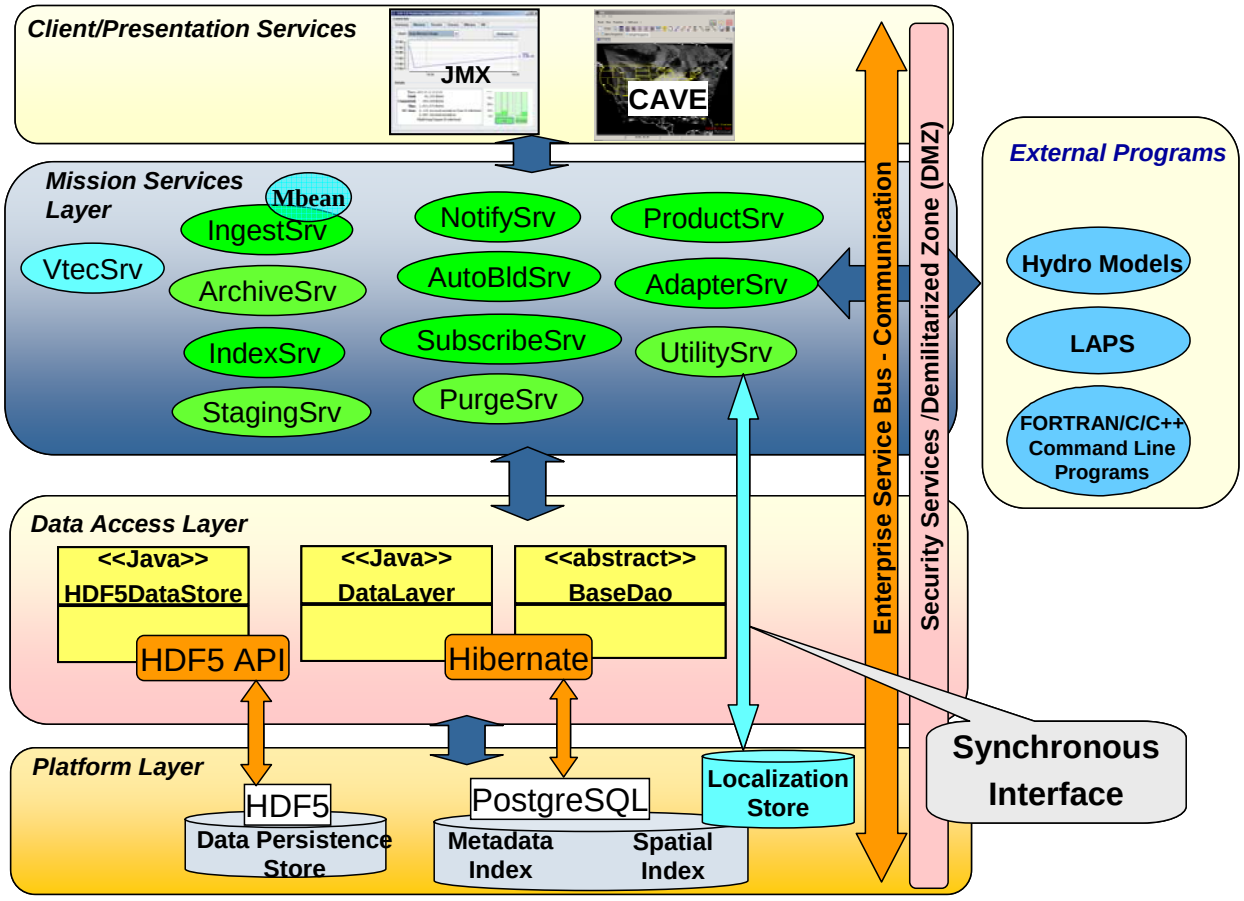

Figure 3-1. Conceptual Architecture Target State Rendering

Additional insight as to how the conceptual architecture rendered in Figure 3-1 can be realized, and why it is beneficial to NWS, follows.

3.3 AWIPS Service Oriented Architecture

"Service Oriented Architecture" has become a buzz word, but what does it really mean to AWIPS II? Service Oriented Architecture, or SOA, is actually a simple concept that has the following attributes:

- System capabilities available as network services.
- Services organized into containers with loose coupling.
- Services composed of components.
- Interface details abstracted away from services.
- Interfaces between services and clients of services defined in a well-known data model.
- Event-driven services.

Descriptions of these basic attributes follow.

System Capabilities Available as Network Services. Figure 3-2 shows the fundamental idea, and illustrates how the AWIPS II architecture can support enhanced service backup, inter-site coordination, and various thin client and data sharing scenarios.

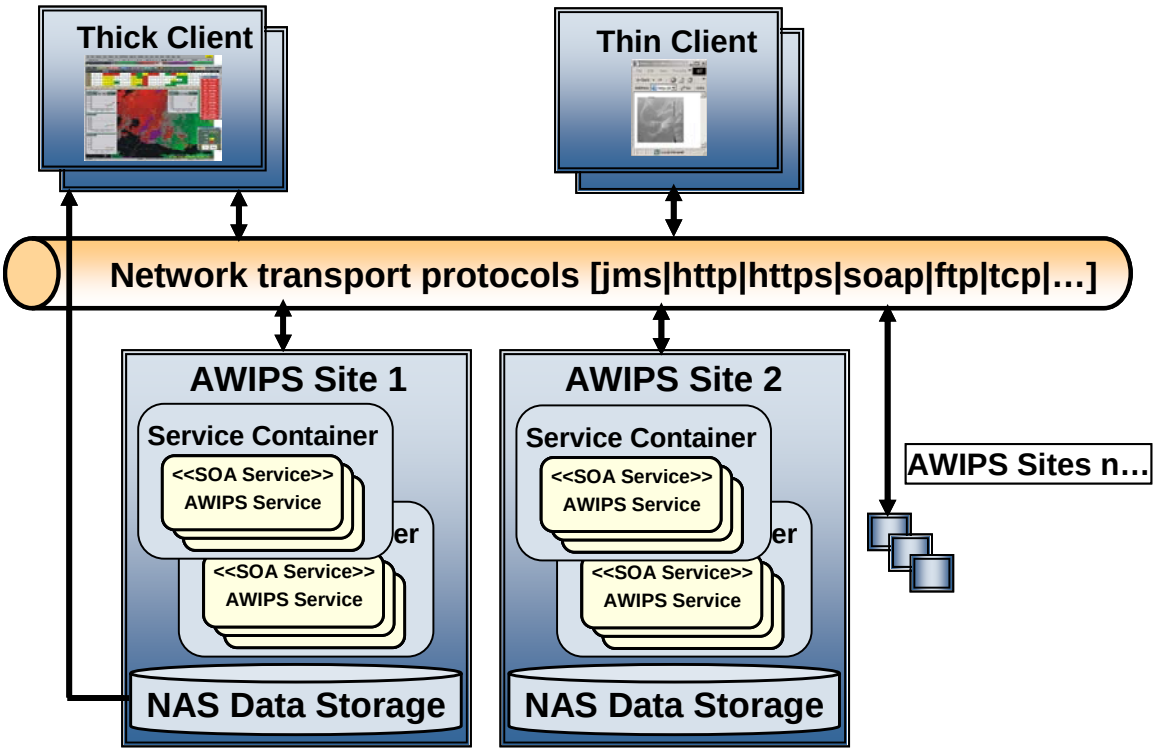

Figure 3-2. System Capabilities Available as Network Services

End users access services via either a Thick Client or a Thin Client. The clients access services via network transport protocols. In other words, the *system capabilities are available as network services*. However, the "network transport" may be implemented on a single workstation or across a distributed environment. Either client can access *any* AWIPS site by simply setting the address similar to a URL. This will support an improved service backup, inter-site coordination, and data sharing services.

The Thin Client has less functionality than the Thick Client, but it can also access multiple sites, and it will fill the needs of Incident Meteorologists (IMET) and Weather Service Offices (WSO) that are being addressed by FX-Net today.

Note the line connecting the Network Attached Storage (NAS) data storage to the Thick Client. This indicates that large data sets can be accessed directly to meet performance requirements.

The current AWIPS Wide Area Network (WAN) places limits on multi-site scenarios. However, the MPLS WAN has the potential to enable this scenario when fully meshed (point to point) and with bandwidth improvements. Data distribution and storage approaches over the entire system can improve the technical and cost performance of the system. Service backup for GFE forecasts could be improved with file distribution and update methods (delta transmission and update).

Services Organized Into Containers With Loose Coupling. As shown in Figure 3-3, services exist within containers that execute within a Java Virtual Machine (JVM) that isolates the container from the specific details of the hardware and operating system, thus enabling platform independence. Services are connected via messages and are isolated from the details of the specific protocol. Loose coupling in software design is not a new idea regardless of the reference ("module," "procedure," etc.). Loose coupling simplifies system maintenance and enables adaptability because of the isolation. A change to a tightly coupled system can ripple through several modules or programs, greatly complicating maintenance or adaptability.

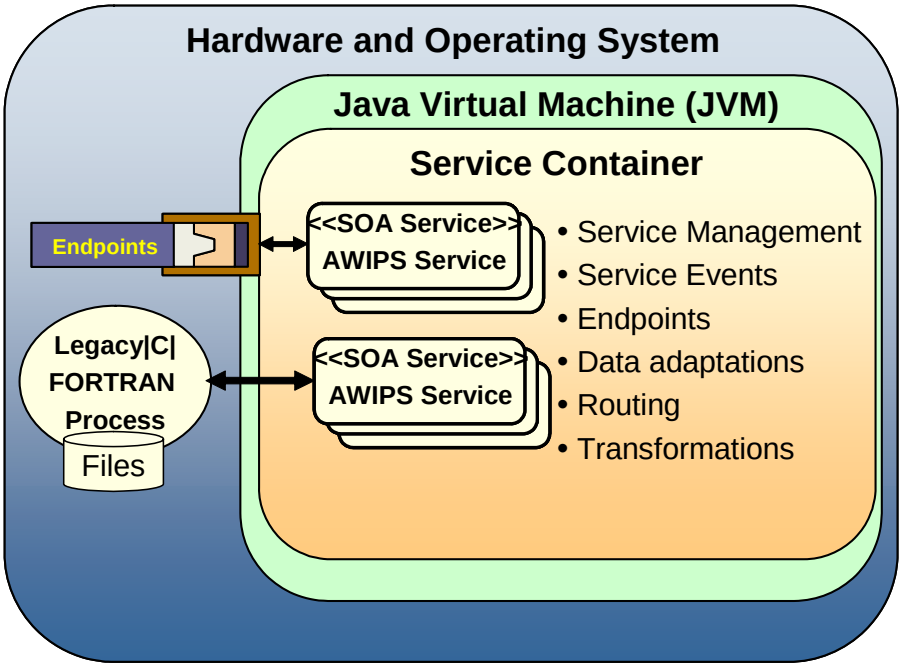

Figure 3-3. Services Organized Into Containers With Loose Coupling

Figure 3-4 lists more advantages of the container-based process over the "Discrete Process-Based Processing Model" used in the current AWIPS implementation.

Services Composed of Components. As shown in Figure 3-5, components can be reused in multiple services. Aside from the coding efficiencies, this also reduces the runtime footprint.

The common practice 10-15 years ago was for each application to contain many core functions that today are available through common services. Being constructed "from the ground up" not only costs more, but it also complicates maintenance and creates "stovepipes." Modern practice is to use "enterprise" services that are "common" to all services of the enterprise, which in this case is NWS. The extended enterprise would include NOAA and other Government agencies.

Past practices were known to be problematic in the big picture; however, the state of the technology (languages, networking, etc.) did not support the "enterprise" approach of common services. It is currently unknown what proportion of the 4.5 million lines of code is dedicated to services that can be made common today.

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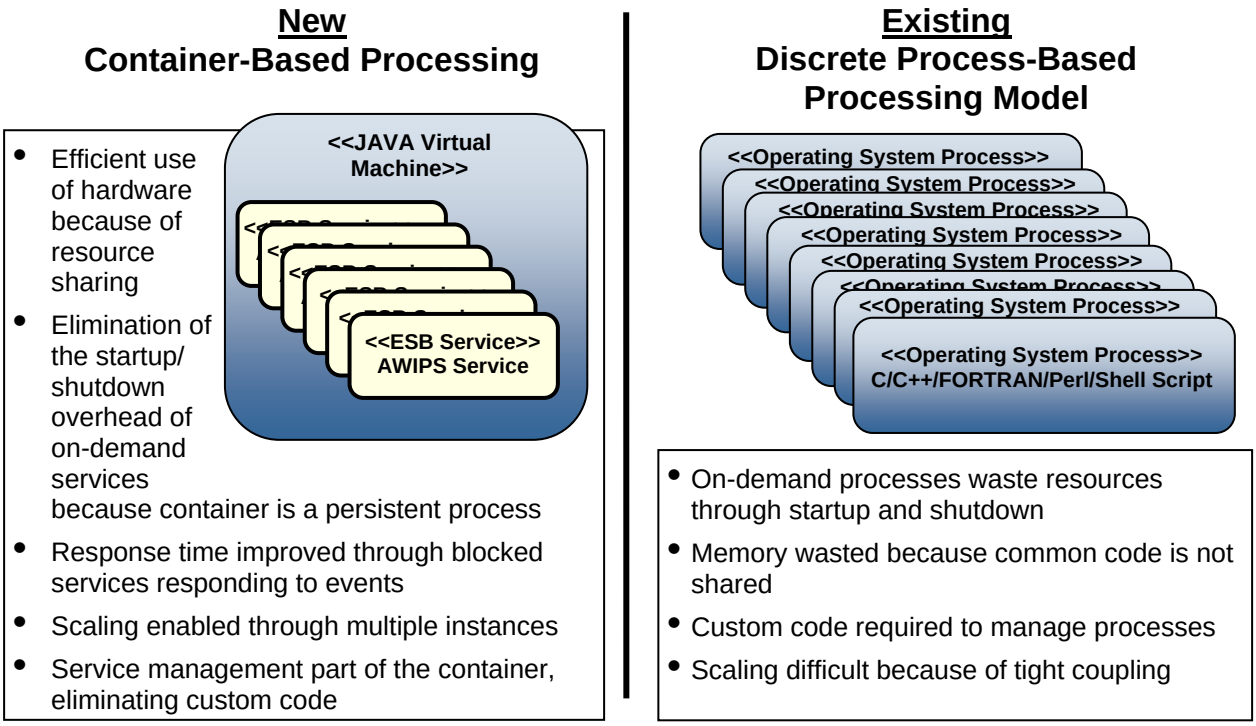

Figure 3-4. Container-Based Processing

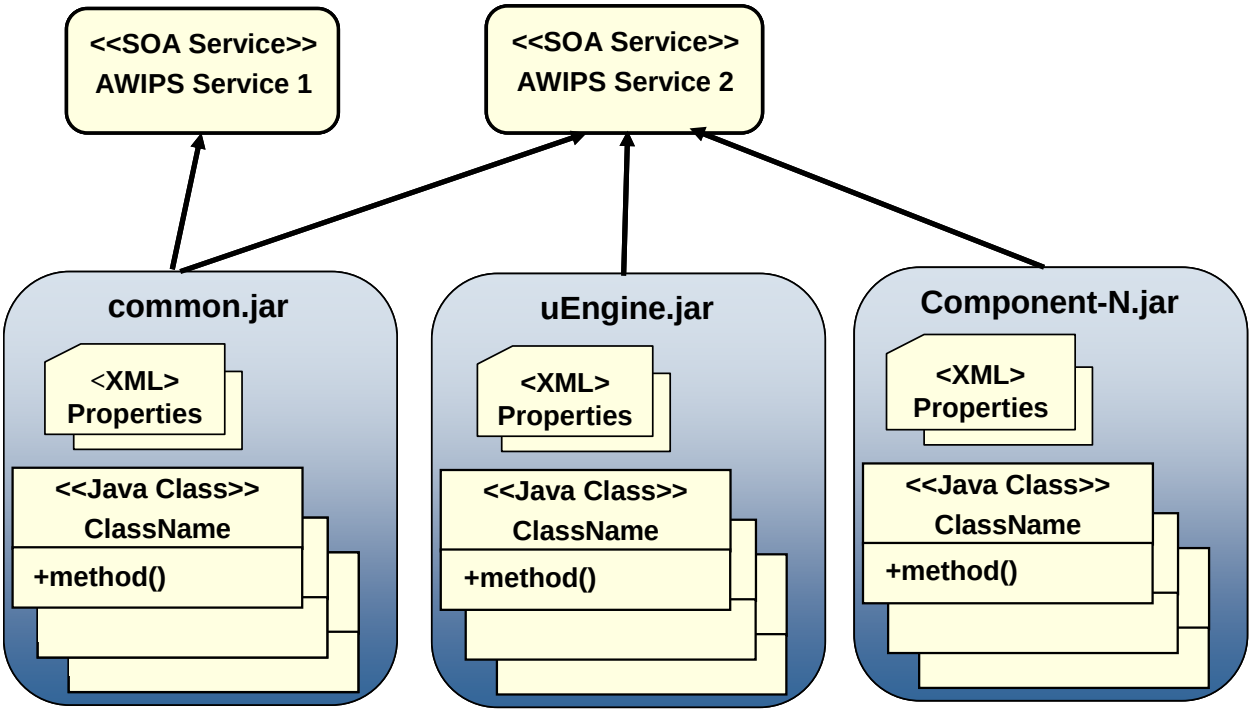

Figure 3-5. Services Composed of Components

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Interface Details Abstracted Away From Services. As shown in Figure 3-6, the current system's tight coupling and requirement for custom code at every interface make it expensive to maintain. The endpoints of the new architecture hide the details of the interface, which reduces coupling. Code remains the same regardless of how it is interfacing with other services or transport mechanisms used.

Abstraction layers are used throughout the new system to hide details of each specific service from the others. This is the same conceptually as hardware drivers that hide the hardware details from software. Major Open Source patterns (e.g., Enterprise Service Bus, or ESB) being used in the new system are also abstracted from the rest of the system, allowing easy changeover to another pattern, if needed or desired. This mitigates the risk associated with technology obsolescence or failure of an Open Source project.

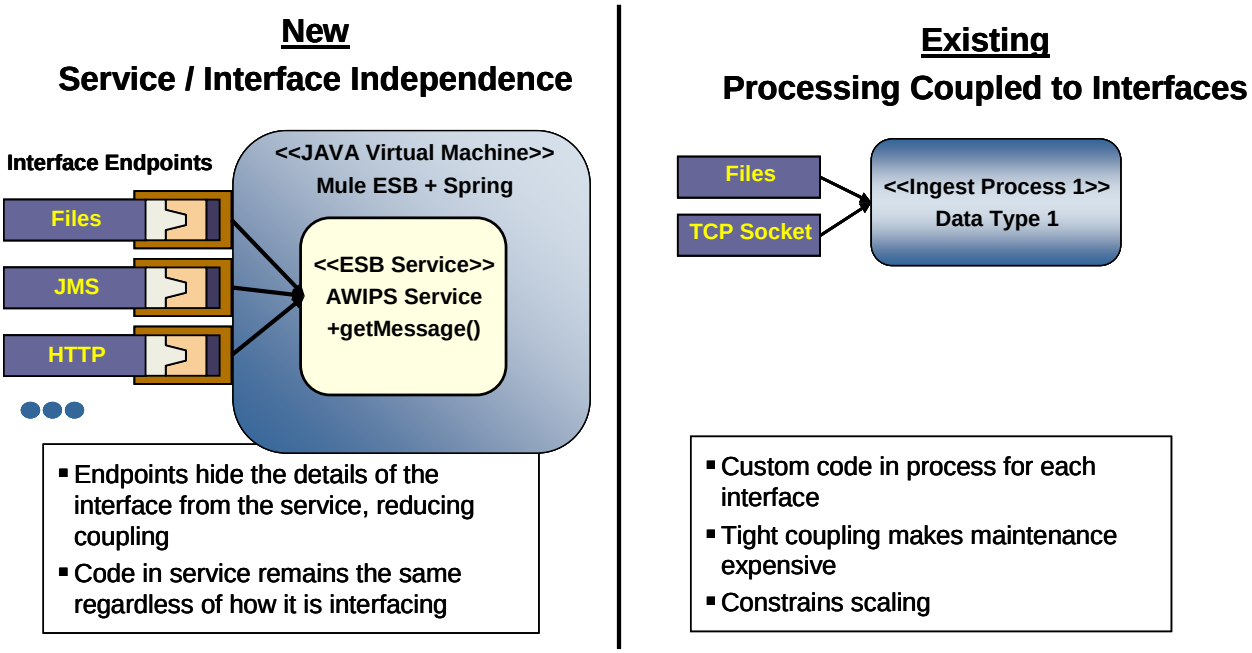

Figure 3-6. Interface Details Abstracted Away From Services

Well-Known Data Model Defines Services and Client Interfaces. Interfaces based on a data model that is clearly defined and well known within the system will enable extensibility and reduce maintenance costs. The current approach appears to be ad hoc or not based on any standard. The new system uses a canonical XML documents interface that follows W3C standards and a common AWIPS XML schema definition for all messages. It also uses standard XML parsers to encode and decode documents and allows the XML decoding to be embedded in base classes of service. As noted in Figure 3-7, which compares the existing and new interfaces, the existing interface requires custom code for each message type, and custom socket protocols require custom "C" code. All this makes maintenance difficult because of the learning curve that is necessary to institute changes.

Event-Driven Services. The new AWIPS architecture will feature a Staged Event-Driven Architecture (SEDA) that will allow processing services to pull from the work queue when they are idle. It also provides for automatic load balancing, load scaling, and fault tolerance. Figure 3-8 compares the "pull data" flow of the new product to the existing system's "push data" flow.

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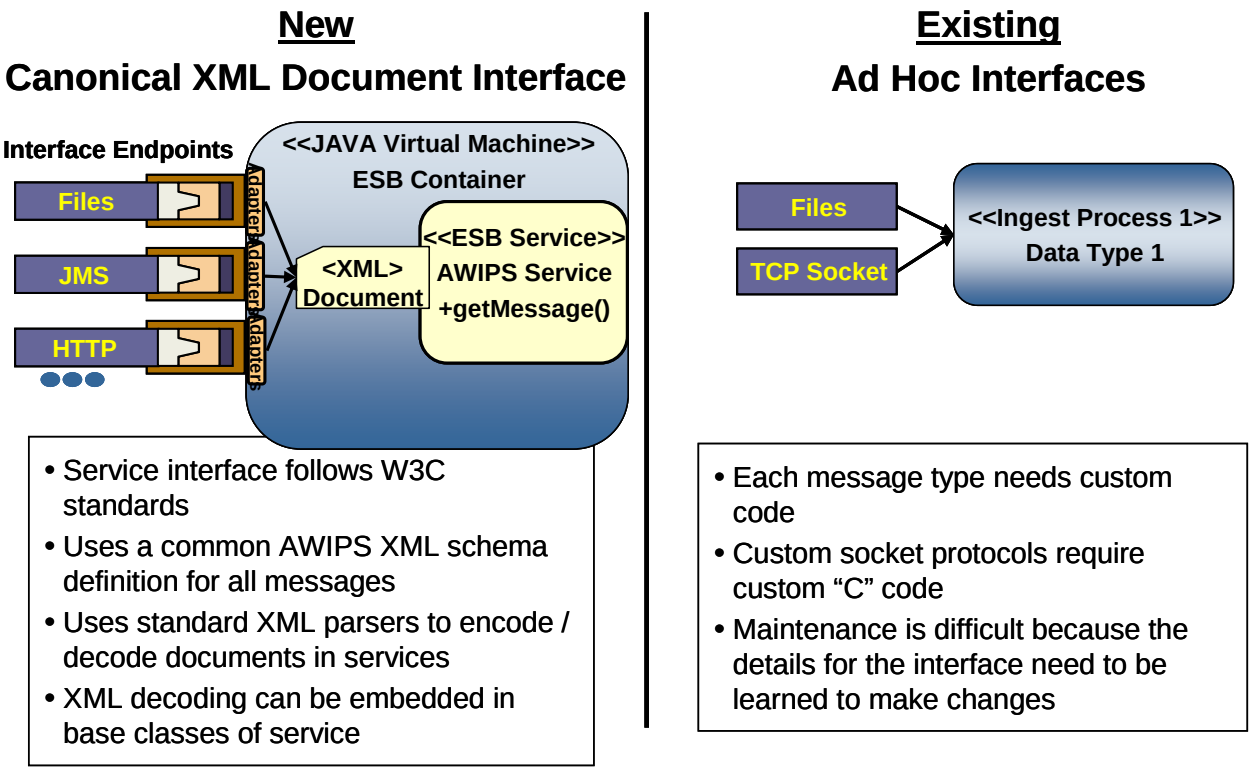

Figure 3-7. Interfaces Defined in Well-Known Data Model

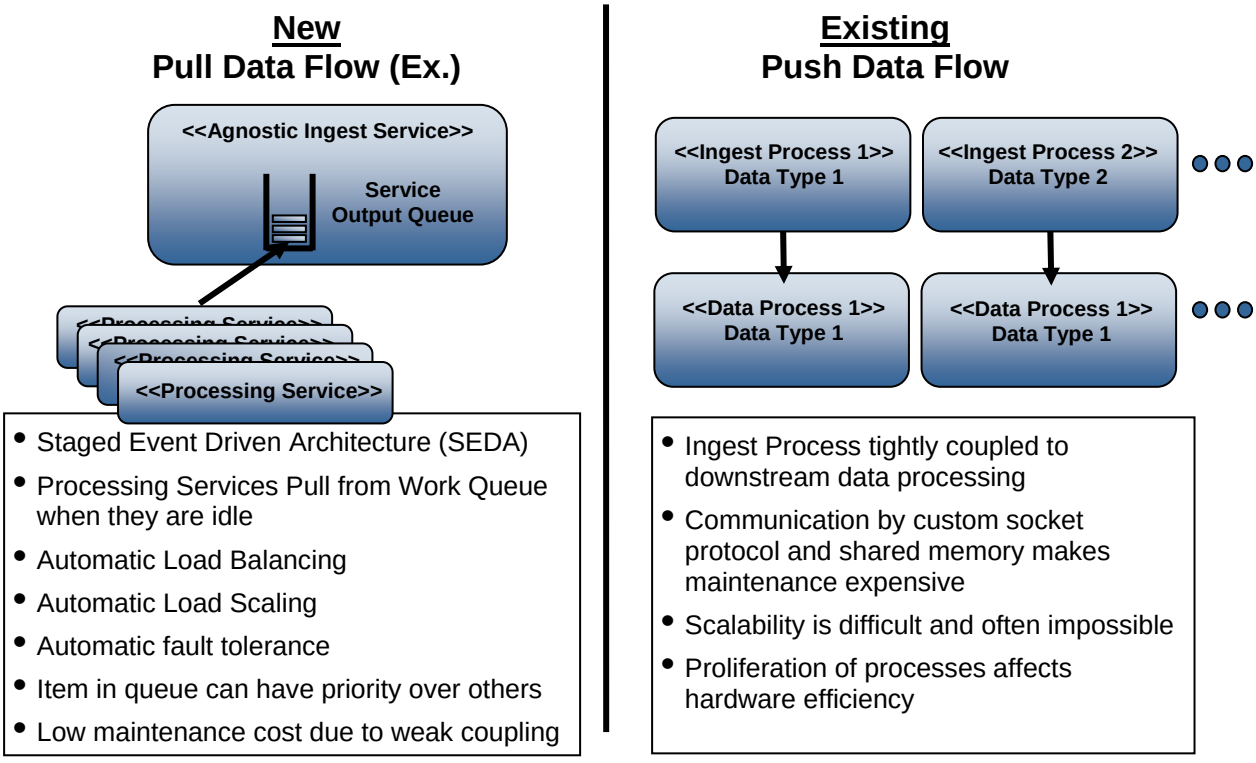

Figure 3-8. Event-Driven Services

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3.4 Key AWIPS II Features

Key features of the AWIPS architecture are as follows.

- Primary system language: Java.
- Layered SOA with container-hosted services.
- Enterprise Service Bus used to interconnect services.
- Services communicated through XML-based messages.
- Thick Client visualization implemented in a Rich Client Platform (RCP) extendable through plug-ins.
- System adapts to new data types and transforms through plug-ins.
- System users extend the capabilities with a scripting language (not compiled Java).
- SEDA clustering, which enables scalability.

Java has been chosen as the primary system language for AWIPS II for several reasons. Java is optimized to be platform independent and is ideally suited for distributed applications through its extensive built-in networking capabilities. Advanced architectural patterns are enabled by Java because it contains the "Interface" class concept and dynamic real-time linking through a hierarchy of class loaders. There is an extensive Open Source code base that provides virtually all the core services needed to implement the architecture.

Java offers many more advantages, including:

- Platform independence via JVM.
- Lower development cost through:
  - Language efficiency.
  - Code reuse through object-oriented concepts.
  - Large body of available open source patterns.
  - Extensive Java Class libraries, which reduces coding effort.
  - Garbage collection, which simplifies coding and increases reliability.
- Improved performance through threading and event-driven design patterns.
- Java Just-in-Time optimization, which eliminates speed advantage of compiled languages.
- Largest population of programmers today.
  - University graduates.
- No competing language on the horizon.
  - Historically, there is a 10-year cycle for new language to become widespread.

Table 3-1 illustrates the reuse readily available with Java, and shows some of the system functions that are being implemented with Open Source Java. As of June 15, 2006, we were leveraging 965,000 SLOC of Open Source.

Table 3-1. Open Source Project Usage in AWIPS II

Function	Open Source Project
Software Build	ANT
Configuration Management (CM)	Subversion + Trac
Enterprise Service Bus (ESB)	Camel + Spring
Integrated Development Engineering (IDE)	Eclipse
Logging	Log4j
Java Messaging Service (JMS) Broker	ActiveMQ
XML Reader	Commons Digester
Web Server	Apache/Tomcat
Data/Class Binding	JiBX XML

The use of the Enterprise Service Bus pattern as the primary mechanism to interconnect Mission Services (Figure 3-1) into a layered Service Oriented Architecture is a key feature. A large set of existing communication endpoints (e.g., File IO, Web services, JMS, TCP, UDP, VM, and serial) is available as Open Source. Adapters interface to the endpoints and isolate weather components from communication details. A standards-based management interface and available patterns enable local or remote system management (e.g., JMX management console), and common logging based on Log4j provides high performance.

XML is the method used to encode the messages between the services and outside users. A canonical (well formed and normalized) XML model will represent these messages, and the formal schemas that define the model become the Interface Control Documents (ICD). XML is a text-based format that is human readable and self-describing. A text-based format is important for eliminating the platform differences of binary data that inhibit platform independence. Tool and parser availability is another benefit of using XML.

A plug-in approach will enable rapid inclusion of new data types and transforms. The implementation code for all data types will be packaged in dynamic deployable plug-ins that follow a precisely defined pattern. This is an advanced enterprise pattern that ensures system adaptability to new data categories and flexibility. The plug-in pattern will be applied at two levels within the architecture. The first is at the data ingest, storage, decoding, and transformation levels of the data processing. Second, plug-ins are a basic part of the visualization framework. These plug-ins can be hot deployable and delivered via network. The decision to enable this hot plug-in deployment capability over the network will be evaluated once all security issues are addressed.

SEDA provides for scalability, automatic load balancing, and seamless “failover.” The development of distributed data caching frameworks and advances in JMS make SEDA practical at the enterprise level.

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Layered Service Oriented Architecture. As noted in Section 3.1, a modern technical reference architecture is an executable environment of services and structure. A standard technical reference architecture underpins the layered services to enable maximum reuse of core capabilities. As Figure 3-9 shows, the AWIPS II high-level technical reference architecture will consist of two major groupings: 1) the layered SOA framework of services; and 2) a visualization framework. These two frameworks will be loosely coupled by a canonical XML model that will be network protocol independent.

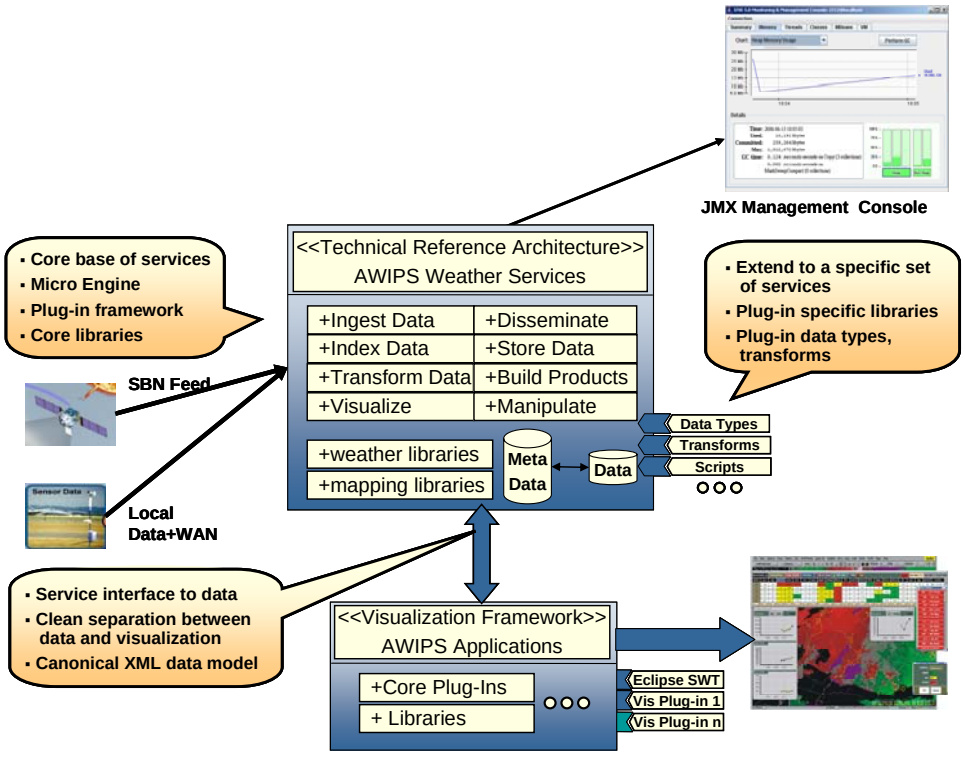

Figure 3-9. AWIPS II System Concept

Figure 3-9 also shows the JMX management console, which will allow monitoring and management of the software either at the site or remotely at the Network Control Facility (NCF). This technical architecture can adapt to a wide range of CONOPS and deployment options. For example, at the minimal end of scalability, all the services can be hosted in a single execution container along with the visualization on a small laptop. This mode of deployment will support the remote user with limited data needs. At the other scalability extreme, the services can be hosted in sets of execution containers on clusters of server hardware without code modification. Multiprocessor high-end graphics workstations can host the visualization applications with the software, taking full advantage of the extra hardware.

Common AWIPS Visualization Environment. A common visualization framework (see Figure 3-10) will provide a platform for reengineering the visualization applications. The framework is based on the Eclipse RCP, which provides an extensive set of human interaction features and is extended through plug-ins. The extensive library of components enables the developer to focus on adding real capability. The visualization framework will consist of a base set of plug-ins that are used to build applications. The capabilities of legacy visualization applications (e.g., D2D, NMAP, GFE, RFS, HydroView, MPE_Editor, XNAV/DAT, FX-C) will be reengineered as a set

of plug-ins built using the common capabilities of the framework. The reengineered visualization applications will maintain the features of the legacy applications such as:

- Forecaster control of D2D (e.g., CONOPS).
- Large data sets of N-map.
- The extensive grid diagnostics of N-AWIPS.
- The Python-based scripting of GFE Editor.

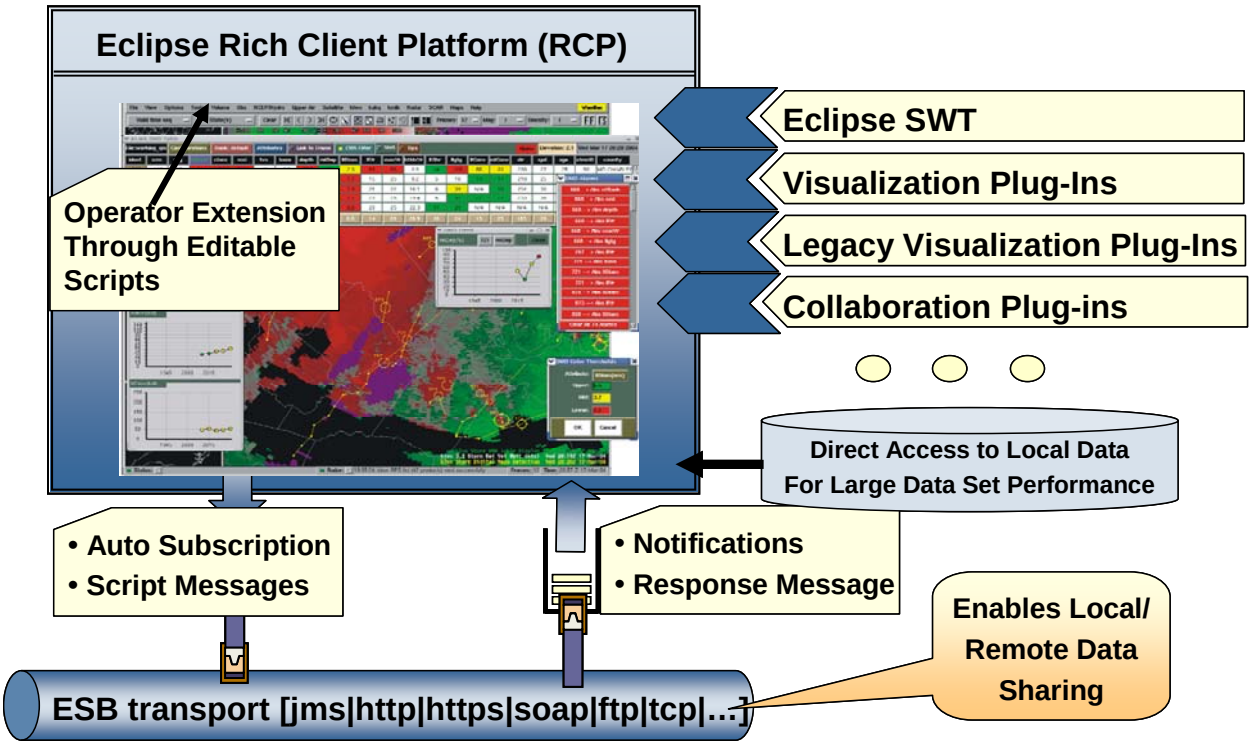

Figure 3-10. Common AWIPS Visualization Environment (CAVE)

The end result will be a platform-independent Thick Client visualization capability – flexible enough to handle the existing weather and hydro needs, with adaptability for changes in CONOPS.

Core framework capabilities beyond the RCP consist of the following:

- Visual rendering that takes advantage of the capabilities of the graphics hardware for performance. This capability uses the standards of OpenGL with a Java API interface and includes, via extensions, the ability to render 2D map-projected data, vertical soundings or cross-sections, and 3D data sets such as radar. Vector, raster, and ASCII data will be supported.
- Quad-Tree tiling at both the disk and memory level maximizes performance and allows rendering of large data sets.
- Automatic data subscriptions and notifications, which enable auto updating display.
- Common event handling for user interactions with displayed data including drawing.

- A wide scalability range from lightweight laptops with limited graphics to top-line multi-headed/multi-CPU workstations.
- The core functionality package, which is a set of plug-ins, and new functionality build upon the existing set.
- Local customization, accomplished through configuration and local application scripts.
- Large data sets, which will be accessed locally and directly to enable performance.

Extensibility Enabled by Plug-Ins for Data Types and Transforms. Data type plug-ins (see Figure 3-11) will lower the effort required to add new data types and are the primary architectural pattern for enabling extensibility and flexibility. The plug-in implementations define the details of how the data are ingested, persisted, transformed, and made available to the visualization applications. Plug-ins can also be used to introduce new science by adding new transformation classes. The plug-in capability will be packaged as a component and made available to any SOA service. The set of plug-ins can be tailored for the particular deployment and enable extending the full capability of the system to local data sets such as Mesonets. A developer at a local site can write a new plug-in and test it locally without rebuilding the system. All data types will be defined in plug-ins to maximize system flexibility.

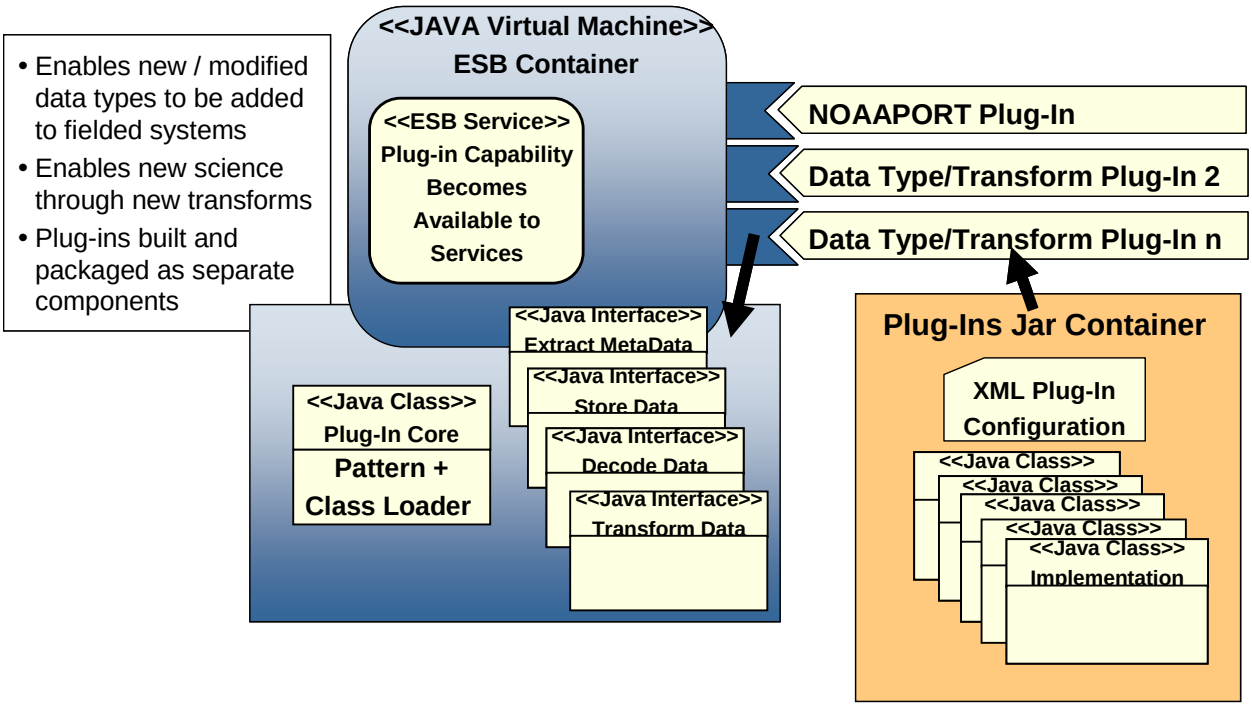

Figure 3-11. Extensibility Enabled by Plug-Ins for Data Types and Transforms

Extending Local Capability via Scripting. A task-based execution model using a micro-engine pattern will be used to create high system flexibility (see Figure 3-12). Micro-engine script execution enables both ad-hoc and data/time triggered product requests. Product building is broken up into small reusable tasks. Transform task chaining enables reuse of small, single-purpose transformation code. Products are available locally and/or remotely via the Thick and/or Thin Client.

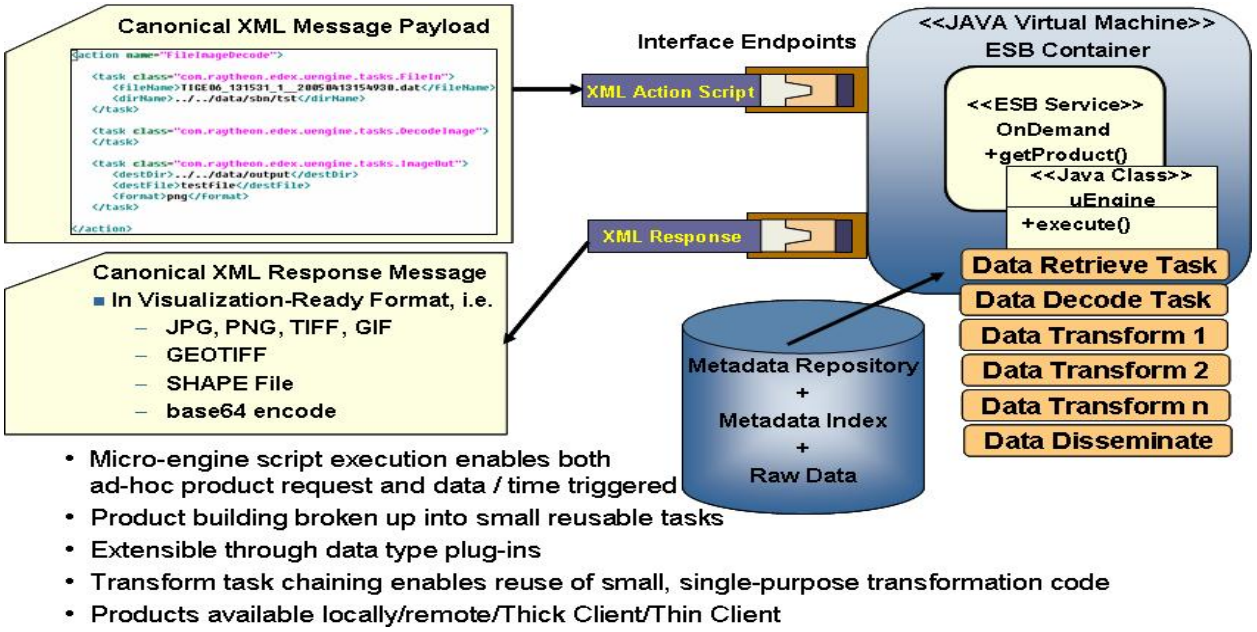

Figure 3-12. Extending Local Capability via Scripting

Sets of tasks will be transported as messages that enable changes in CONOPS through changes in endpoint addressing. The system becomes easily extensible by adding new tasks either through the data-type plug-in or to a component library. A scripting task will be part of the core system, enabling clients to extend the functionality of the system. Python (e.g., Jython) is the leading candidate for the scripting capability to maintain legacy compatibility and existing operator training.

A very simple XML scripting capability based on simple tasks for straightforward data retrieval and transformation will be provided. This simple XML scripting will support remote data access.

Data Type-Independent Metadata Indexing and Query. Data type-independent metadata is engineered into the technical architecture from the beginning (see Figure 3-13). The raw data repository is independent of data type, and queries will work the same way regardless of data type. However, implementers can choose to use the metadata pattern, or ignore it and go directly to a persistence repository. The persistence repository is keyed by Universal Resource Identifier (URI), which enables support for remote access of local data and subscription services. Data persistence can be by RDBMS or by the file system. Data containers such as HDF5 and NITF are supported.

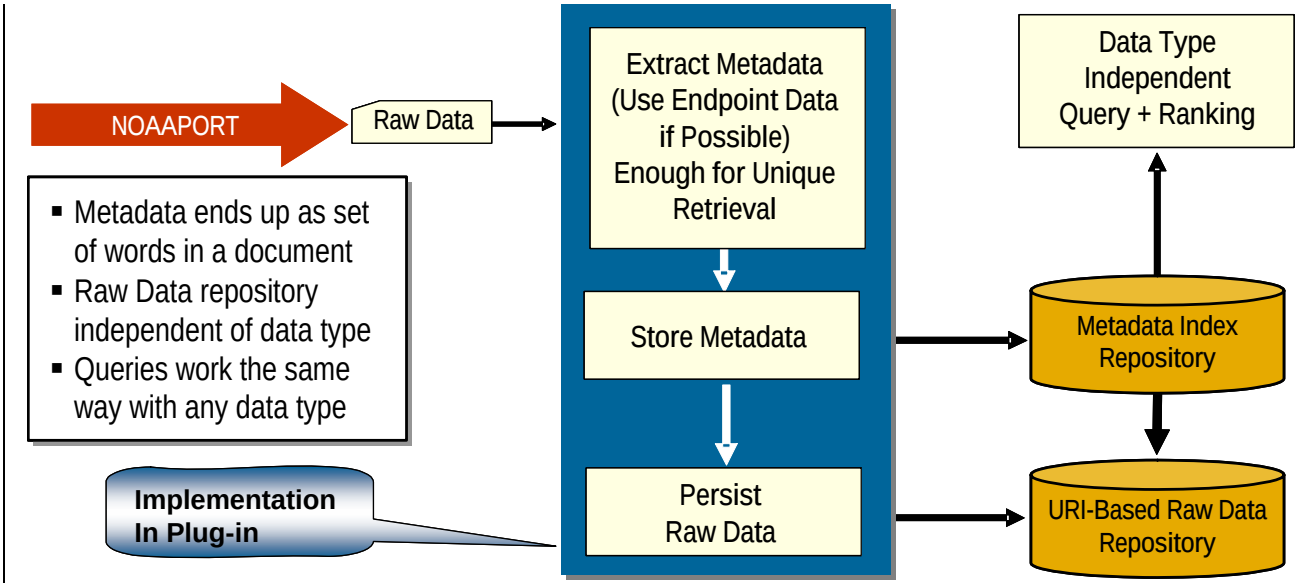

Figure 3-13. Data Type-Independent Metadata Indexing and Query

3.5 AWIPS II Implementation Approaches / Features

Additional implementation approaches and features of the proposed architecture include execution containers to support the layered SOA, XML binding, data persistence, adapter patterns for enabling reuse of "C/FORTRAN," maximization of the map re-projection performance, and "vector" data representation. Table 3-2 expands on additional approaches and features. Descriptions of the planned design patterns for notification and subscriptions and data caching patterns – which are also key components of AWIPS II – follow the table.

Table 3-2. Additional AWIPS II Implementation Approaches/Features

Approach/Feature	Details
Execution Containers to Support the Layered SOA	A lightweight dependency injection container integrated with a flexible Enterprise Service Bus (ESB) {Spring+Camel ESB}.
	Enables high performance through Serial Event Driven Architecture (SEDA) for data flow between services.
	Adding a JMS broker further enables performance by extending SEDA to above the container level and enhances reliability through automatic message persistence.
	Dependency injection enhances maintainability by minimizing component coupling and enhances flexibility by allowing component interconnections to be defined through configuration.
	ESB enables a decoupling of services from network and interconnection protocols that enhances maintainability and flexibility of services.

Approach/Feature	Details
XML Binding	Several XML binding approaches have been evaluated from our experience base.
	XML binding is traditionally a messy area that affects maintainability and performance to gain standardized interface structures.
	JiBX is a binding approach that is relatively simple, has good performance, and can map to standard attributes in ordinary Java classes.
	JiBX is being planned to provide a standard pattern for services to get at XML message elements.
	Commons Digester is another approach for binding Java Objects to XML and is being planned for binding configuration data.
Data Persistence	Reverse Indexed Metadata for all ingested data enables new data types to be incorporated through plug-ins.
	"Universal Resource Identifier" (URI)-referenced data keyed to metadata: Enables remote access and simplicity of design.
	URI referenced data simplifies notification design.
	HDF5 for grid persistence gains standards compliance and performance for large data sets.
	Purge, backup, and archive mechanisms have no impact operations.
Adapter Patterns for Enabling Reuse of Legacy "C/FORTRAN"	Java Exec and stream I/O pattern is a simple approach that allows legacy to run unmodified.
	An adapter pattern based on "GluGen," allowing legacy "C++" to run in the same process space as the container is being planned.
Maximizing the Map Re-Projection Performance	An approach that makes map re-projection available at several locations within design {Services, Thick Client, and Thin Client}.
	Map library design optimized for performance and accuracy.
	Map library based on a concept of a "Map Data Set" structure that holds the metadata for a particular geo-referenced product.
	Re-projection based on a dynamic scheme that balances speed with accuracy.
"Vector" Data Representation	SVG: A widely adopted vector standard that is rendered in browsers.
	Offers extensive primitive capability; wide tool availability; common Web-based approaches for style and element access.

Design Patterns for Notification and Subscription. Notification and data subscription will be a core part of the architecture. AWIPS II will have no separate "Notification Server." The subscription and notification service will support auto updating of visualizations both locally and remote. The service will also support automatic product building and product dissemination.

Visualization and data will be keyed by a unique URI to support notification. Each rendered data element will have a URI that can be tied to displayed data. Ingestible data will have a similar URI to enable the display to tie to a raw data element.

The notification service will be fronted by a SEDA queue to maximize scalability. Notification events will be triggered on data arrival with clients receiving an event through an ESB endpoint (JMS Topic). Notifications of subscription satisfaction will be data ingest and/or time triggered (*Spring* has a Quartz scheduler). A cached data structure will hold the subscription request, which can be scaled.

3.6 Security Considerations

The current approach for AWIPS security is a hardened perimeter with restrictive policy implementations. The current security implementation is an impediment to collaboration with external entities and communication with NWS customers. The need for interagency communication is growing, and an approach needs to be developed that will enable the needed collaboration while meeting the security needs of NWS. SOAs will require authentication of services as well as people. In the longer term, AWIPS II may need to accommodate authentication packets from external Government agencies and NWS customers as consumers of services.

AWIPS II will have user authentication built into the system from the start; it will not be added as an afterthought. The planned ESB has Security Infrastructure facilities for endpoint authentication and service authentication, and transports with secure protocols like SSL (Secure Sockets Layer) and HTTPS (Hypertext Transfer Protocol Secure).

AWIPS will undergo a Certification & Accreditation plan update in mid 2008. AWIPS II software update will require an update to that C&A. The fundamental security architecture (i.e., hardened perimeter) will not change for AWIPS II Release 1.0 because collaboration with external agencies is not a requirement for AWIPS II Release 1.0. We will provide the technical controls required by the C&A. Future external collaboration requirements can be accommodated when it becomes a requirement.

3.7 Technical Risks and Mitigations

Raytheon will employ an automated Risk Assessment and Management Planning tool as we develop AWIPS II to document and report on project risks and our approaches to risk mitigation. The features of this tool – known as “RAMP” – are described in this PIP at Section 4.3, Risk and Opportunity Management. In this section, we identify potential risks to the technical performance and longevity of our Open Source approach to AWIPS software re-architecture and describe some “general mitigations” that have been put in place. Over the life of the project, these and other risks will be entered into a risk register that will be maintained electronically, avoiding the need to modify the PIP as risks are addressed under each subsequent TO.

Technical Risks. Raytheon has identified risks commonly associated with Java and Open Source software. As shown in Table 3-3, these risks can be mitigated, and in some cases the risks are not as significant as they might be perceived to be.

Table 3-3. AWIPS II: Technical Risks/Mitigations

Risk	Mitigation Approach
The performance of a Java code base could be inadequate (e.g., rendering, data ingest, warning generation)	This is no longer the risk it may once have been. Today's Java code performance equals C/C++ for most applications.
	Just-in-Time optimization eliminates the speed advantage of compiled languages.
	Provide risk reduction demonstrations to verify and illustrate the ability of Java code to perform at acceptable levels.
	Improve performance through threading and event-driven design patterns.
Java could be replaced by a new language.	Research indicates that there is no competing language on the horizon. This implies 10+ year life for Java.
The Open Source choice could dissolve or become dormant.	Open Source segments are wrappered to enable a swap, in the event it becomes necessary. NWS also has the source code for all open projects and may decide to continue using the code.
New technology developments (future evolution) could render the system obsolete.	Loose coupling and service containers enable repackaging to utilize the new technology.

General Mitigations. Raytheon has instituted several "general mitigation" approaches that will limit the level of technical risk associated with the AWIPS II project. Among them are:

- ***Raytheon Internal Research and Development (IRAD).*** Using Raytheon R&D resources and funds, we have developed, implemented, and tested concepts in advance of committing them to AWIPS.
- ***Risk Reduction Demonstrations.*** A Risk Reduction Demonstration (RRD) is a technique used to verify the viability of specific implementation approaches for critical system capabilities early in the development cycle. The prototype (i.e., not production hardened) implementations address key functional capabilities and/or system performance. A performance RRD provides an indicator or relative measure of performance rather than an absolute measure. The goal of the RRD is to determine if the approach is likely to produce the required performance. Marginal performance results indicate more investigation is needed. Functional RRDs are typically conducted to prove (or demonstrate) that a particular functionality can be provided. Success is generally more black and white than a performance demonstration in that the function is performed or not. RRDs are performed to address concerns of requirements realization. Raytheon has and will continue to perform *functional* and *performance* risk reduction demonstrations as needed. These RRDs will be specified in Task Order Proposals.
- ***Industry Trends and Development.*** We will monitor the industry for more Java-based capability in work, and for hardware and networking advancements relevant to AWIPS.
- ***Existing Algorithms.*** We will "borrow" from the current system in cases where we determine that the reuse of existing algorithms or the encapsulation of existing code serves

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to mitigate development risks without compromising future performance. Raytheon and NWS will work together to decide which algorithms to use when different algorithms exist in AWIPS I for the same problem. (e.g., calculate relative humidity). NWS will also review Raytheon data sets used to verify migrated algorithms.

4. Project Management

4.1 Assumptions

Raytheon made several key assumptions during development of the original proposal for this effort (see Figure 6-4 of the proposal), and revalidated them during Task Order 1. These assumptions follow.

- This plan assumes reuse of software, both from the current AWIPS system and from other Raytheon weather programs under development.
- The project requires free and open access to NWS personnel at NWS Headquarters, the Regional Headquarters, the development labs, and various WFOs, RFCs, and National Centers on a non-interference basis. This access is required to complete an accurate assessment of the current AWIPS system and identify critical data and work flows.
- Software developers will use existing office workstations and Open Source tools. Software developed on this project will be made available, on a non-proprietary basis, to the National Weather Service and associated development organizations.
- Configuration management and software builds will be performed at the software development team location until the first system is deployed to the field. Development servers will be obtained and installed through the recapitalization of ongoing server upgrade activities.
- The team will require access to all weather data available to operational AWIPS organizations. Raytheon has installed a NOAAPort antenna and receiver at the Omaha office and will use that system to emulate the Satellite Broadcast Network (SBN) data feed. Other data flows into AWIPS will be identified during Task Order 2, and necessary steps will be taken to capture those data for use during development.
- During Task Order 2, interfaces to automated sensors that directly feed the current operational AWIPS systems will be identified. Steps will be taken to emulate those live sensor feeds; they will be identified during Task Order 2.

4.2 Organization

Figure 4-1 shows the organizational structure for the SW CTR software re-architecture project. Management controls include programmatic control through the AWIPS Evolution Manager, and strategy and architecture controls via the Chief Systems Architect and Strategy Manager. Various Raytheon functional organizations, including IT support, and process and engineering management, provide additional support to the development activities executed on the project.

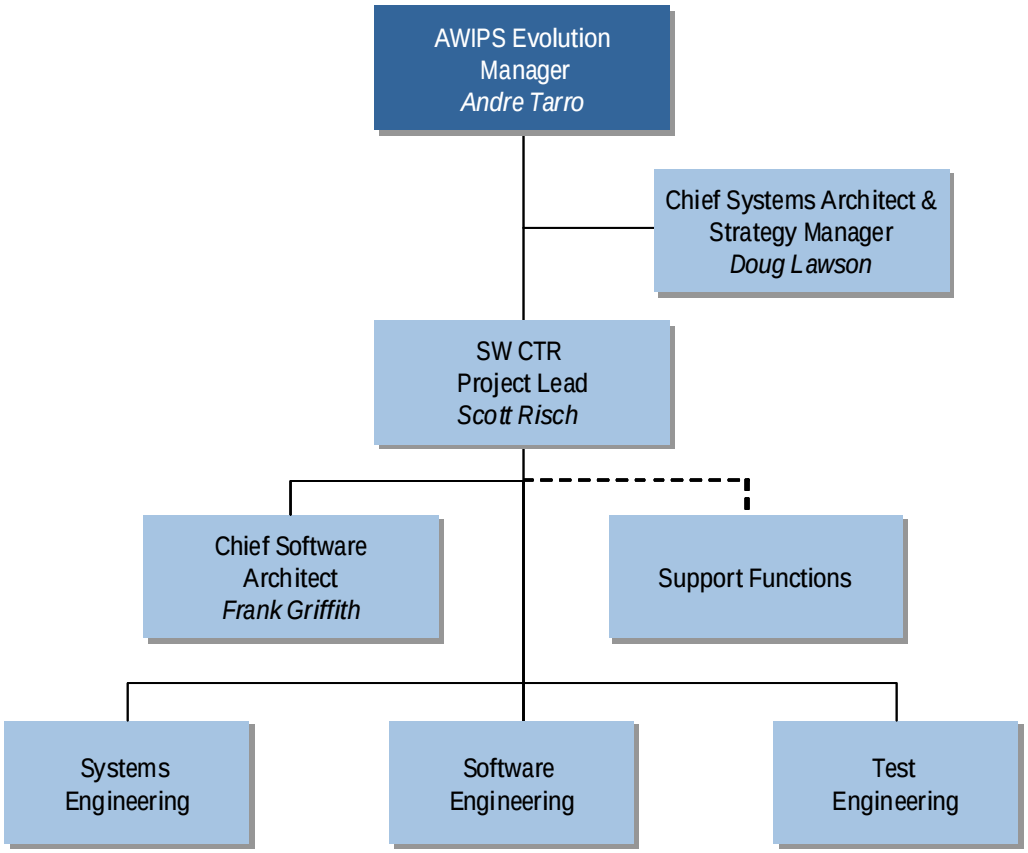

Figure 4-1. AWIPS SW CTR Project Organization

4.3 Risk and Opportunity Management

No project of this size and scope is without risk. Risks and opportunities that arise throughout the project will be collected and centrally managed in a risk database called "Risk Assessment and Management Planning" (RAMP). RAMP, an MS Access-based risk management tool developed by Raytheon, will be adapted for the purposes of collecting and reporting risks and opportunities related to the SW CTR project.

The Raytheon project team will review risks on a weekly basis, and will report to the customer on risk/risk management at the regular meetings of the Partnership Integrated Product Team (PIPT). Major risk items will be elevated to Program Management Office Risk System and maintained in the risk register.

Additionally, the Raytheon project team will work with the Office of Science and Technology/Systems Engineering Center (OST/SEC) Programming Branch to capture technical risks. The Programming Branch will be the collection point for technical risks identified by the NWS. Raytheon will meet with the Programming Branch at least once a month to review the SW CTR technical risks. Technical risks will also be reported periodically to the AWIPS Evolution Leadership Committee (AELC).

Figure 4-2 is a screen capture of the risk and opportunity management tool.

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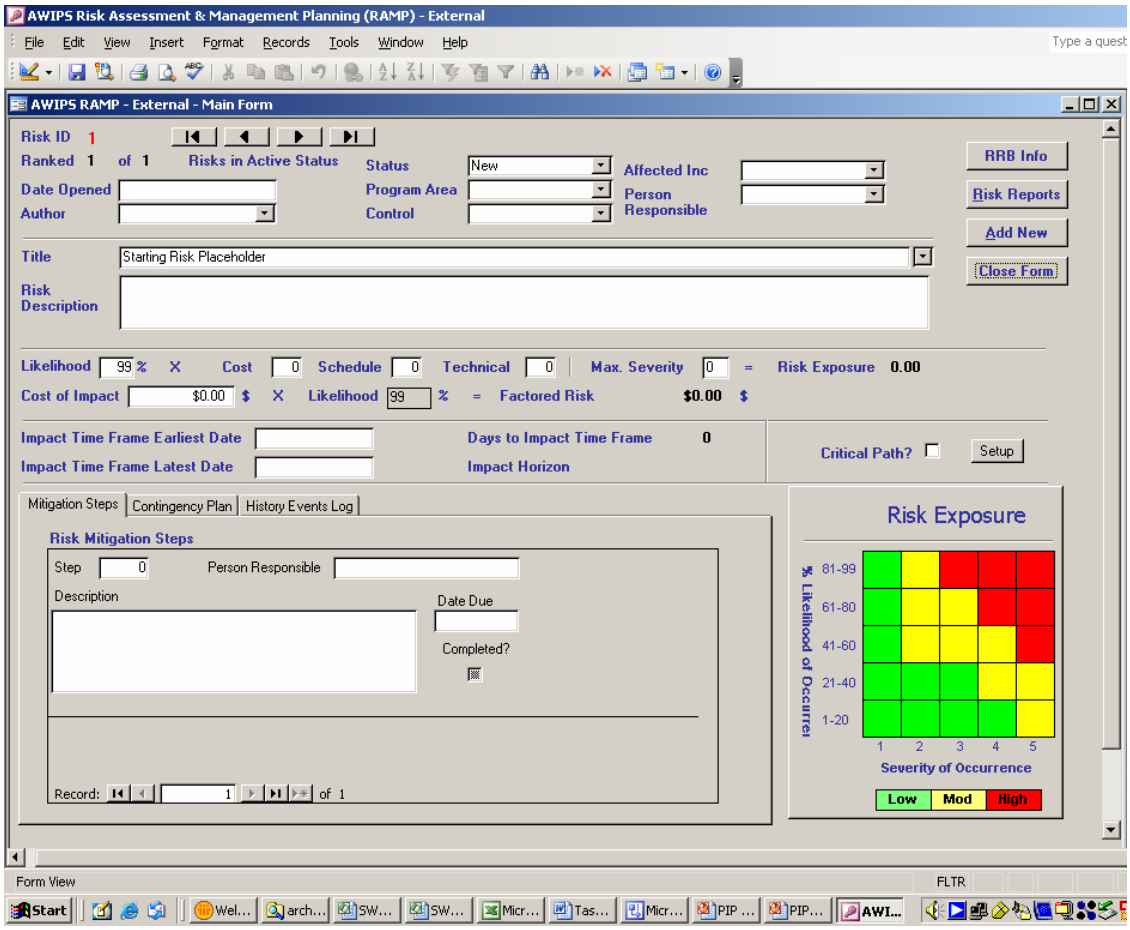

Figure 4-2. Risk / Opportunity Management Tool

4.4 Decision Management: Governance

Given the ambitious goal of developing a complete system re-architecture for AWIPS, a discussion of decision management or governance over the project is critical. Section 4.2 introduced the Raytheon AWIPS II organization. In parallel with the contractor team, NWS has established an AWIPS Evolution Leadership Committee (AELC). The AELC has established an AWIPS Evolution Management Plan to document the relative roles of NWS and the Raytheon AWIPS Team. Long-term Governance is a separate topic that addresses decisions related to changing AWIPS II over time. A brief discussion of long-term AWIPS II governance is included in Section 10.6.

4.5 Technical (Management) Controls

The project team developed a series of tailored plans to guide the software portion of the AWIPS SW CTR project. These plans were developed under Task Order 3 and updated under appropriate subsequent Task Orders. They are:

- *Program Management Plan (PMP)*. Defines the management approach for the project, including planning, execution (monitor and control), and project closeout activities. Because to the relatively small size of this project, the Software

Development, Configuration Management, Quality Assurance, and System Engineering Management Plans described in this section are included in the PMP.

- *Software Development Plan (SDP).* Defines the management approach to planning, designing, developing, controlling, and tracking software development across the engineering life cycle of the project. The plan will outline the development activities, the development library, coding standards, and the safety and security of the software development environment.
- *Configuration Management Plan (CMP).* Provides a detailed description of the tasks associated with managing the configuration of the software during development. The CMP will follow well-defined and documented procedures and processes for developing high-quality software and for managing the project baseline once established.
- *Quality Assurance Plan (QAP).* Documents the procedures for establishing and maintaining product and process integrity based on both contractual and company requirements. The QAP will detail activities conducted to profile various well-established engineering standards and procedures, tailored for the AWIPS SW CTR project.
- *System Engineering Management Plan (SEMP).* Documents the system-level requirements and lays out the plan to develop a coherent and consistent AWIPS system across all stakeholder organizations within NWS.
- *Additional Technical Controls.* Includes routine interaction with the AELC and NWS leadership; Technical Interchange Meetings (TIM) with development organizations; updates to the PIP and software development metrics.

4.6 Integrated Master Plan; Integrated Master Schedule

The Integrated Master Plan (IMP) contains a high-level description of the project, including the end-state deliverables of the system and the path (including key milestones) to get to the end state. The IMP does not contain detailed schedules or cost information.

The Integrated Master Schedule (IMS) includes a high-level project schedule and provides a framework for the more detailed Work Breakdown Structure (WBS). The WBS resource loads hours and people against individual tasks. The IMS is maintained and updated as required as each Task Order is added to the program.

4.7 Facilities and Capital Equipment

The software project team performs work at Raytheon's offices in the Scott Technology Center of the Peter-Kiewit Institute on the campus of the University of Nebraska and at Raytheon's Silver Spring, Maryland facility. Developers will use their standard desktop workstations for software development and testing. The AWIPS program provided the development and database servers through recapitalization of equipment made available through the normal cycle of hardware refresh at the Raytheon test bed facility in Silver Spring, MD. The Raytheon Information Technology (IT) staff provides on-site support for the servers and desktop development environments. Development occurs within the One Raytheon Integrated On-demand Network (ORION).

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4.8 Formal Reviews and Reporting

The IMS includes milestones to account for formal project reviews at various decision points. At a minimum, these reviews occur near the conclusion of each TO. The AWIPS Evolution Manager and the Chief Systems Architect represent the development team at regularly scheduled AELC meetings. These meetings provide a forum for communicating the status of development activities. Raytheon will also report the status of the project at regularly scheduled PIPT meetings.

5. Software Development

5.1 Software Configuration Management

Raytheon established a software Configuration Management (CM) environment on the development servers during Task Order 3. The CM tool is *Subversion*, which is a Java-based variation of the commonly used CVS tool. The development team also uses the Open Source tool *Trac* for project management and another Open Source tool – *Cruise Control* – for routine software builds.

5.2 Testing

Testing is a continuous process throughout the software development life cycle. The Software Development Plan, developed under TO3, defines objectives, procedures, and schedules for:

- Unit Test – during development.
- Integration Test – as components are brought together to form the system.
- System Test – at the end of integration and prior to final acceptance testing.
- Acceptance Test – final stage of test where NWS will accept the new system.

In addition to formalized testing, developers submit software for formal review in a series of Code Reviews conducted throughout the development phase. The results of those code reviews are documented and added to the software library. Details of the early stages of testing are documented in the SDP developed during TO 3. Later in the development cycle, at the time of system testing, a separate Test Plan (TP) was developed. The TP includes the details of system testing and indicates the timing and location of the System Test. There are also other opportunities throughout the development cycle for users and developers to get an early (hands-on) look at the new system. The details of these opportunities are provided in appropriate TOs and in updates to this PIP document.

5.3 Documentation

During project startup, a number of documents were created that guide the software development process. Several of those documents are identified in Section 4.5. In addition to those documents, a set of project instructions was created. These instructions provide the developers with guidelines for completing routine development activities.

“Javadocs” are written on all components and services of the new architecture, and account for the software details of AWIPS II.

Additional “deliverable” documentation is developed under individual TOs as required. TO proposals detail all deliverable documentation associated with that particular TO.

5.4 Standards

The AWIPS II software development team will adhere to Sun Java coding standards for Java coding standards, and will follow Raytheon software coding standards for C, C++, and Fortran, if used. The coding standards have been made available to the NWS.

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All other technical standards related to the software project or interfaces to other parts of AWIPS Evolution (i.e., hardware and communications) will follow Raytheon standards.

5.5 Tools

Raytheon will use appropriate software development tools, including:

- MS Visio Professional – to build the system and software architectural artifacts.
- Eclipse – used by software developers both as an Integrated Development Environment (IDE) and as a Rich Client Platform (RCP) to build client-server applications.
- Subversion – a Java-based CM tool similar to CVS.
- *Trac* – an Open Source, project management tool.

A more detailed list of tools is included in the SDP developed during TO3.

5.6 Backup and Recovery

Raytheon has instituted backup and recovery procedures to protect the development environment. Details of the backup and recovery procedures are documented in the SDP.

5.7 Security (Information Assurance)

Raytheon has established physical security measures to protect the development environment from outside intrusion and unapproved access. ORION is a protected Wide Area Network with sufficient security measures in place to protect corporate assets and intellectual property from outside interference. This same high level of security provides the security necessary to protect both the development environment and the software being developed for AWIPS SW CTR.

6. AWIPS Software Migration

6.1 Migration Approach

The "black box conversion" mentioned as a fundamental approach to AWIPS II migration means that the current AWIPS "applications" functionality will appear the same to the end-users (e.g., forecaster, hydrologists), but the inner workings of AWIPS that produces the end-user functionality will change.

The conceptual approach to migrating AWIPS to AWIPS II follows.
AWIPS II functionality can be divided into two broad categories: end-user and infrastructure. Migrating AWIPS to AWIPS II involves creating the infrastructure functionality that enables the creation and execution of end-user functionality (whatever the end-users see and touch generally manifests in GUIs and hard/softcopy output). When the migration is complete, AWIPS II will be a single environment of *end-user* and *infrastructure* functionality. Everything needed to create and execute desired end-user functionality will be present in the environment.

The overall approach to migrating AWIPS to the new AWIPS II architecture is to first design the framework and implement *sufficient* infrastructure functionality to begin migration, and then migrate end-user functionality *while* implementing the remainder of the needed infrastructure functionality. We start end-user functionality migration *before* the infrastructure is complete. Beginning end-user functionality migration with an infrastructure that is incomplete, but sufficient, rather than waiting until the infrastructure is "complete" reduces overall project cycle time and cost. Risk Reduction Demos (RRD), discussed in section 3.7, were employed to manage technical risk. The collection of sufficient infrastructure functionality to begin end-user functionality migration is ADE 1.0.

During Task Order 7, "Migration Planning," the existing AWIPS I code base was analyzed in detail and fundamental migration methods were examined for different applications. Options considered were: "delete", or don't migrate obviated code or applications to be retired; encapsulate, or interface, legacy code (e.g., RFP, LAPS); and re-engineer and re-implement application functionality. Most code fell into the last category.

The existing code was decomposed into discrete functions. During this process, AWIPS I functional redundancy was identified. The redundant functions will be re-engineered into a single function (or infrastructure capability) and re-implemented using the ADE capabilities in AWIPS II. This will eliminate the redundant code and greatly reduce the size of the code base. The discrete functions will be "reassembled" to replicate AWIPS I forecaster functionality. Because this approach does not convert one application at a time, a means other than "checking off" the applications was needed to ensure everything is migrated. To meet this need, a "capabilities matrix" was created that maps the discrete re-engineered functions to the AWIPS I CSCIs (computer software configuration items). The Capabilities Matrix also groups the discrete functions into the four software migration task orders (TO8, 9, 10, 11).[1] The functions are scheduled for migration within the task orders to maximize integration opportunities (or not miss

[1] The Capabilities Matrix was delivered to the NWS with Task Order 7.

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them!). This means that major applications such as D2D, GFE, and Hydro will actually be migrated over multiple task orders. Additionally, risk reduction efforts in the form of early, or advanced, development will occur in TO8 and TO9 addressing aspects of GFE and Hydro. At that point, the implementation method will be known and it will be more of a "turn the crank" effort for the respective task order. The two-year software migration will be composed of four task orders, each of which is nominally six months in duration. Table 6-1 shows the basic organization of the task orders and their "themes."[1] As can be seen in the figure, TO8 is primarily D2D, TO9 is primarily GFE, TO10 is primarily Hydro, and TO11 implements plug-in applications (e.g., SAFESEAS).

Table 6-1. Task Order Themes

Task Order Themes	TO8	TO9	TO10	TO11
Workstation Capabilities				
D2D + 80% Primary Capabilities	x			
D2D + 10% Secondary		x		
D2D + 10% Lowest Priority			x	
Graphical Forecast Editing Suite				
GFEsuite + 10% Repository	x			
GFEsuite + 80% Primary Capabilities		x		
GFEsuite + 10% Secondary			x	
Hydro GUI System and IHFS				
Hydro + 10% IHFS Repository	x			
Hydro + 10% CAVE Perspective		x		
Hydro + 80% Primary			x	
Communications and Plug-In Applications				
Extensions + 100% Primary				x

These discrete functions were also grouped into the following major categories: Workstation Capabilities (CAVE); SOA Service Capabilities; SOA Plug-ins; EDEX Common Library; and Data Management. Table 6-2, "Discrete Function Summary" shows the number of discrete functions for each category and Task Order. It should be noted that some functions are bigger than others, and that these counts can change over time; nevertheless, the table should provide a sense of "size" for the preceding discussion.

[1] TO11 has been structured differently than the description provided here. See the update in section 2.4 for more discussion on the approach for TO11.

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Table 6-2. Discrete Function Summary

Functional Breakout	Task Order				
Category	TO8	TO9	TO10	TO11	Total
Workstation Capabilities (CAVE)	15	13	16	18	62
SOA Service Capabilities (EDEX)	4	9	3	5	21
SOA Plug-Ins	14	5	2	1	22
EDEX Common Library	4	2	3	2	11
Data Management	4	2	3	2	11

6.2 Migration Task Order Summary Descriptions

Some of the details of this section have been overcome by events. Please see the Task Order 11 Proposal for more information on the remaining SW migration work. No attempt will be made to update this section with "as delivered" capabilities. Readers interested in such detail may refer to the software deliveries and associated delivery test reports.

Brief descriptions of the task orders planned during the migration phase (i.e., before deployment) are provided in this section. Additional detail will be provided in subsequent task order proposals; details may change in the future if needed.

Task Order 8, "Core Workstation Capabilities"

- Delivers the Initial Core AWIPS-II Workstation Capability.
- Includes the ingest, indexing, and storage of data from the SBN for bin Lighting, GINI Satellite, Grib1/2, RAOB, basic Text, Aircraft, Maritime, Radar, TAF, Synoptic, and METAR.
- The CAVE workstation will have core vector, raster, X-Y graphs, and text rendering. All the ingested data listed above can be rendered.
- CAVE will include the D2D-style volume browser with load modes and time correlation.
- Will include D2D capabilities for displaying plot data, custom color map editing, text display, warning generation with limited VTEC, and Skew-T views of vertical data.
- The radar will have the all-tilts from ADE 0.2 with the 4-panel display linked cursor.
- CAVE will have the full menus to support D2D, GFEsuite, and Hydro with actions only for the D2D for evaluation.
- Includes limited workstation modes, localization, history, and procedures.
- Includes the Radar interface to the ORPG.
- Includes a basic SHEF ingest capability as a risk reduction for Hydro migration planned in T10.
- Will add a framework for the GFE to CAVE as a risk reduction for TO 9.
- Will implement a prototype plug-in for GFE grids and supporting services along with the IHFS hydro database to reduce the risk of migrating GFEsuite and Hydro applications.

Task Order 9, "Graphical Forecast Editing Suite"

- Builds on T08 by migrating the major functionality in GFEsuite.
- Extends CAVE with a GFE perspective that will include grid rendering with color maps and the rendering of grid edits.
- Migrates the existing Grid Manager, Spatial Editor with the editing tools.
- Includes GFE watches and GFE workstation localization.
- Includes workstation enhancements with a Smart Tools interface mechanism.
- Continues risk reduction efforts for Hydro capabilities with a River Pro framework, time series, and point data control.
- SOA plug-ins for the GFE grids will migrate existing commands for grid management, text management, and administration.
- Extends the UtilSrv to support color maps, map projection commands, and VTEC commands.
- Includes decoders for bufr, afos, dpa, and products.
- Builds the GFE data model and tools to support the model into data management.

Task Order 10, "Hydro GUI and IHFS"

- Extends TO9 base with Hydro capabilities.
- Includes a (CAVE) hydro perspective that has hydroview, hydrogen, riverpro, report alarm, and the MPE editor.
- Includes capabilities of hydrobase, site-specific hydrologic predictor, and product tools.
- Completes the GFE temporal editor to finish the GFEsuite capability.
- Completes workstations enhancements for alerting.
- Creates interface to the RFS to allow it to be part of the SOA.
- Implements SOA plug-ins to support ingesting SHEF data from LDAD.
- Implements the rate of change checker.
- Implements the IHFS database with new data access objects and supporting utilities.
- Encapsulates RFS.

Task Order 11, "Communications and Plug-in Applications"

- Finishes the migration by re-engineering a series of independent applications. These include the SCAN-Rapid SCAN tools, SafeSeas, Snow, Fog Monitor, FFMP, Climate Tools, Hourly Weather Roundup, Haz collect, and local storm reporting.
- Migrates hydro dam crest tool.
- Completes GFE daily forecast critique and ASCII grid import/export.
- Extends SOA plug-ins to support LDAR, LAPS interfaces, and LAPS tools.
- Migrates the MHS to an ESB approach.
- Migrates CP functionality and CP interfaces at the NCF.

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- Re-engineers LDAD.
- Includes support for Software Integration and Test (SWIT) and CM Transition of AWIPS II R 1.0 code base.
- Includes Sync for OB9 Corrective and Adaptive changes (Baseline Changes will be treated separately).

Each of these Task Orders also includes:

- OB Impact analysis (changes that have been made between the end of TO7 and initiation of subsequent TOs), which may include replanning the migration tasks.
- JavaDoc for all developed code.
- Copy of Raytheon Test Plan, Test Procedures, Associated Requirements Traceability Matrix (RTM) and Test Report.
- User Functional Test DR Disposition Report.
- Task Order Technical Outbrief and RRD for advanced development work.
- Input to training material updates as appropriate. [Note: There will be a separate Training Task Order.]
- Redlines of AWIPS User's Manual, System/Subsystem Design Description, and System Manager's Manual for affected sections (delivery of updated UM, SSDD, and SMM occurs with TO 11).
- Release Notes.
- Incorporating selected DRs.

6.3 Special Topics

This section addresses questions that have been raised regarding other aspects of the software migration.

Algorithm Selection and Verification

Question: How will algorithms be verified to produce the same results as AWIPS I, and in cases where there are multiple algorithms calculating the same thing (e.g., relative humidity), how will you select the one to use?

Response: Unless otherwise directed, only the implementation of the algorithms will change. Algorithm concerns identified by Raytheon will be raised to NWS for rapid resolution. Raytheon will construct drivers for existing and replacement implementations. Drivers will call existing or new algorithms as appropriate, with defined data sets appropriate for the algorithm. Output of existing and new algorithm implementations will be captured and compared during software unit tests. NWS is requested to participate in identification of appropriate data sets composition. Timing data will also be collected and recorded for the execution of each function. For output data set comparison, acceptable margin of differences will be coordinated. Any questionable differences will be coordinated with NWS for resolution.

Geo-registration

Question: How will you verify that satellite, radar, and other images are correctly placed on the map?

Response: Geo-registration verification is accomplished in several ways, depending on the data that is to be verified. A key feature of the AWIPS II/CAVE application is the interactive ability to display the latitude and longitude of the cursor location. This allows direct geo-registration verification of station, geo-political and topographic data. Accuracy of AWIPS II geo-registration is verified by examining the corner points of images and comparison with the source image data. Geo-registration of grid data will be verified using test grid sets in cylindrical equidistant projection and verifying the location of the key test features on the display. Inclusion of latitude and longitude as a parameter also will be used to verify accurate geo-registration. Differences are to be anticipated based on varying earth models. Radar geo-registration will be verified similarly. If NWS has test data sets to support this testing, Raytheon will be happy to use them.

GFESmart tools and Python

Question: Will Python be supported?

Response: Yes

FEWS and AWIPS II

Question: We've heard that "FEWS" will be included in the first release of AWIPS II. Is that true?

Response: No. AWIPS II Release 1.0 will co-exist with FEWS to the extent that FEWS exists.

Sync with OB Builds

Question: What is your approach for staying in sync with OBs?

Response: As of this revision (entering Task Order 11), we are building to OB9.1. The content of OB 9.2 and OB9.3 is not known as this time, and their release dates are well into the execution of the task order (see Figure 2-3). Whether or not, or how much of, 9.2 and 9.3 will be included in TO11 needs to be assessed at the time the facts of each are known.

6.4 Local Applications (LA)

AWIPS II will provide a software environment that:

- Minimizes the need for "work-around" code for production operations;
- Allows for "peaceful co-existence" of Baseline and LA code; and
- Allows for easier adoption into baseline where appropriate

Field operations will be able to extend AWIPS II baseline capabilities via plugs-ins, scripts, and legacy adapters (C and Fortran). These are essentially the same capabilities to extend AWIPS II provided to the development organizations. However, it is anticipated that a large proportion of LA needs will be met without Java programming. Python, the uEngine, the Command Line

Interface (CLI), and the subscription services provide a very powerful environment without the need to program in Java.

Local Application (LA) migration is the responsibility of the NWS and field organizations. The primary project objective is to deploy AWIPS II as scheduled; therefore, LAs need to be migrated in time to avoid deployment delays, i.e., all LAs may not need to be migrated for a particular site at the time of deployment.

Due to developments over the past 18+ months, requirements and methods for LA migration are now simpler and more familiar. The widely used "textDB" and "handleOUP" utilities, ported to Python in AWIPS II, are accessible through a simple CLI. Local Apps will use the utilities "as is" for AWIPS II. Python is now the recommended scripting language, but rewriting existing LA using other scripting languages is not necessary.

A uEngine Command Line Interface will provide a mechanism to retrieve and transform AWIPS II ingested data types. One accesses the uEngine CLI from the command line or the tools language "exec" capability. The AWIPS II subscription service is useful for time or data event-triggered operations providing the equivalent for AWIPS I triggers.

A Java-to-Python Bridge delivered with TO9 greatly reduces the effort required to migrate the huge number existing Smart Tools to AWIPS II.

The National Core Local Applications Development Team (NCLADT) is the NWS focal point for Local Apps migration. Raytheon conducted several Technical Interchange Meetings (TIM) with LA developers over the last 18+ months. The exchanges provided a forum for providing Local App developers with AWIPS II information as well as providing Raytheon with more information on specific LA functionality. The simplifications discussed in the previous paragraphs were a direct result of the TIMs. At this time, the field appears well positioned to accomplish the necessary LA migration for AWIPS II deployment.

6.5 Documentation

Documentation provided with ADE 1.0 will be updated as needed throughout the migration (e.g., Javadoc, Tech Brief). Current documentation that Raytheon is responsible for also includes the AWIPS User Manual (UM), Systems Manager's Manual (SMM), System/Subsystem Design Description (SSDD), and Release Notes. This documentation will be redlined in appropriate sections with each task order, and the updated versions will be delivered with Task Order 11.

Updating other related documentation such as the AWIPS Integration Framework Manual (AIFM) will be the responsibility of the NWS.

6.6 TTR/DR Processing Coordination

The NWS uses "TestTrack Pro" as a defect tracking and management system. Raytheon uses "TRAC" in Omaha to track and manage DRs. Each organization has its own processes, and a detailed discussion of these processes is beyond the scope of this document. The TO11 proposal outlines a TTR/DR processing approach for the task order.

NWS and Raytheon have been following a disposition process for Task Orders through TO10. The term "TTR" (TestTrack Report) is used to avoid confusion with the term "DR" used with

AWIPS I. TTRs are written for all NWS AWIPS II testing efforts (IV&V and user). The TTRs are sent to Raytheon, and Raytheon analyzes and dispositions them. Raytheon enters TTR information into its DR system, TRAC, to manage them. Some of the defects have been fixed in task orders subsequent to the TO being tested; others will be addressed during TO11.

TO11 will introduce "pre-OTE" testing directed by SEC. "Pre-OTE" testing will be more extensive than the "Delivery Tests" performed with TOs 6, 8, 9, and 10. Section 2.4 discusses the conceptual approach for TO11. "Pre-OTE" testing will begin with each interim software delivery. The NWS will consolidate TTRs by culling duplicates and non-defect TTRs prior to submitting them to Raytheon. Raytheon and NWS will jointly disposition the submitted TTRs in scheduled project coordination meetings (as defined in the TO11 proposal) and decide if the defect needs to be corrected prior to OTE entrance. This process is outlined in the TO11 proposal and will be finalized by Raytheon and NWS mutually as part of the TO11 proposal process.

OTE System Testing is expected to report defects and issues via TTRs. However, at the beginning of the "field operations" testing at the sites, defects and issues should be reported using the Trouble Ticket Process. The actual processes are still to be determined as of this revision date and will be defined prior to start of OTE.

Raytheon does not expect its basic TTR/DR *release* processes to change with OTE. That is, "DR releases" may occur on a biweekly basis, or more frequently if need dictates.

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7. AWIPS I Baseline Software Migration Risks

Risk analysis has been ongoing during this project. Risks are entered into the Risk Assessment and Management Plan (RAMP) as they are identified. Migration risks are generally associated with resource management between AWIPS II and AWIPS I. These resources include Software Maintenance and Support (SMS) labor and test beds. OB content is a significant driver for these resources and the appropriate balance must be set and managed to avoid schedule slips in AWIPS II. Other risks are associated with inadequate communication among the many stakeholders of AWIPS. Technical risks are not technology based as much as managing discovery and the schedule. A primary worry for many people has been whether the performance of AWIPS II will be adequate at operational loadings. Because the whole system needs to be in place to *completely* determine system performance, it can be difficult to predict system performance from an incomplete system as delivered. Many areas of performance have been addressed during the migration effort as more applications and capability have been added. Performance testing and tuning will continue in TO11. The “full” system will be available as of interim delivery 6, and resources for performance testing have been planned in the task order.

Risks associated with Local Application migration have continued to be reduced over the course of the project. The retention of Python support for Smart Tools and the provision of Command Line Interfaces have significantly mitigated the risk.

Risks requiring Raytheon/NWS coordination are logged in the RAMP Risk Register. Reports are available on the Raytheon AWIPS O&M Program Management Portal. More recently, the NWS formed a NWS-only team to address risks. Those risks are not coordinated with Raytheon.

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8. Training

Several groups will need AWIPS II training on the ADE/SDK and/or System Administration. Application usage training will be limited to selected "variances" to AWIPS I "black box" behavior. Groups requiring training include:

- ADE/SDK: Dev Orgs, Local apps developers, SST/HST, NCF, SMS
- System Administration: ITO/ESA (Information Technology Officer/Electronic Systems Analyst), Application Focal Point (AFP), SST/HST, NCF, Dev Org Sys Admin
- "Variance": Forecaster, AFP

[*Note:* Individuals within these groups may not need all of the training in the type shown. Note also that some group(s) may not be listed. For example, application focal points (AFP) may only need the localization portion of the Sys Admin training.

Training activity is composed of two major categories – course content development and training delivery. NWS is responsible for training delivery to NWS/NOAA personnel, and Raytheon is responsible for training Raytheon Team personnel.

Raytheon will support NWS training efforts by providing technical content for the training material, and technical consulting during courseware development. Raytheon will also support the NWS delivery of classes by "sitting-in" during initial classes to provide technical support to instructors (i.e., answer questions from the class.)

Raytheon delivered the initial developer training with TO3, 4, 5, and 6, and provides updates to the slide package with each SW migration Task Order (e.g. 8, 9, 10, 11). Raytheon provides training support via a specific task order, TOT1, described later in this section.

8.1 Developer Training

NWSTD provides AWIPS II ADE/SDK training to developers via "distance learning." Raytheon supports the NWSTD activity by providing updates to the developer "briefing" slide package, providing technical documentation (e.g., "MicroEngine commands"), providing "how to examples" (often heavily annotated portions of actual code), and conducting technical reviews of NWSTD-prepared material.

Developer training topics include:

- Foundation Course[1]
- Script Development
  - Using script language
  - Extending script language
- Cave Plug-ins
  - Creating menus in CAVE

[1] Available from Learning Tree International. Suggested additional courses which are also available from Learning Tree include Spring/hibernate, Best Practices in Java, and Eclipse IDE.

  - Using the localization pattern within CAVE
- SOA Plug-ins
  - Data ingest
  - Using Data access
  - Micro Engine extensions
  - Configuring Camel end points
- Using the Localization Pattern
  - Extending the meteo library

The topics will change as need dictates.

8.2 System Administration Training

The material needed for AWIPS II System Administration is the same basic topics in existing NWSTD courses updated for AWIPS II specific differences.

Two courses provide the framework and topics needed: "AWIPS Operations Support" (course number M-21-02); and "AWIPS Systems Manager" (course number M-18-02). "AWIPS Operations Support" is primarily for Application Focal Points[1] while "AWIPS Systems Manager" is for people performing AWIPS System Administration (e.g., ESA/ITO). Raytheon will provide technical documentation to support updates to the affected content of these courses for AWIPS II. Material will be provided during TO11 on a schedule agreed to by Raytheon and the NWSTD.

Other topics of interest include:

- Foundation Course (NWS SOA and/or AWIPS II architecture overview)
- Clustering and other hardware considerations
- Local Application configuration management.

8.3 Training Support Task Order Description

The training support Task Order includes upgrading the training material delivered with SW migration Task Orders (e.g., "Programmers Briefing"). It will add material for new ADE features as well as "how to" examples for scripting and micro-engine usage, creating CAVE plug-ins, and data plug-ins.

Technical documentation to support System Administration training course development will be delivered with Task Orders 8, 9, 10, and 11 as the capabilities are developed. Note that this is not special content packaging. Technical support will be provided to the National Weather Service Training Division (NWSTD) for courseware development. This support will take the form of a briefing of the material, reviewing courseware for technical accuracy, and answering questions.

[1] An AWIPS Operations Support attrition course will not be taught during the AWIPS Migration Deployment. Training on individual applications will be developed and delivered as Application Focal Point training

Training delivery support will be provided by “sitting in” (via telephone) on specific initial training sessions to answer technical questions as needed to support the trainer. This will be provided for both Developer and System Administrator training as requested.

NWSTD has requested a week-long TIM for application focal points and train-the-trainer sessions for System Administration Training. Rather than generate a Task order for this single item, this support will be added to TO11.

9. Site Migration and Deployment

Site Migration is composed of the process and activities performed to transition a site to an Operational State using AWIPS II. This section discusses the preparation and steps required to accomplish the transition.

Site Migration includes the following activities:

- Application Software Functionality Testing
- Configuration Data Migration (localization and customization)
- Smart Tools (et al.) Migration
- Local Applications Migration
- Environment Configuration Migration (Hardware, Operating System, Utilities, Drivers, etc.)
- Training (Forecaster, Sys Admin, Application Focal Points).

Obviously, this work must be completed prior to Operations Cutover, and cannot be done on an AWIPS Operational System due to the risk of operations disruption. The hardware needed to support these activities is a standard AWIPS workstation with CAVE and EDEX installed. Canned data is assumed for these activities. (*Note:* While SBN live data can be "easily" set up, ORPG and LDAD require more changes to the AWIPS I site configuration. Large canned data sets are less intrusive to the AWIPS I environment at the site.) After completion of the site migration activities, the basic installation approach is as follows:

- Load A2 on A1 system (using install scripts provided by Raytheon).
- Enter Service Backup.
- Shut down A1 and start A2 (A1 remains on hardware).
- Perform Startup testing (includes Local Apps).
- If okay, go *out* of Service Backup and into operational mode.
- If issues arise that cannot be resolved, *stay in* Service Backup mode.
  - If fix is going to be "lengthy," roll back to A1 (last resort). (*Note:* A major issue – requiring several days to resolve – would not be expected at this time due to preparatory testing.)
  - When fix is applied and tested, *return* to Service Backup, re-start A2, and resume testing.
- When satisfied with A2 Operation, remove A1.

Detailed cutover and rollback procedures will be tested, finalized, and documented during TO11.

During deployment, it will be necessary for sites on AWIPS II and sites on AWIPS I to perform Intersite Coordination (ISC) and Service Backup. OTE includes "deployment interoperability" testing prior to site cutover. Interoperability amounts to the ability of AWIPS I and AWIPS II sites to share the relevant data.

More discussion on Site Migration is included in the outbrief for the Deployment and Transition Planning (DTP) Task Order, a copy of which is attached as Appendix A. Detailed documented procedures for performing site migration and installation will be delivered with TO11.

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10. Transition to O&M

The transition to O&M includes transitioning the Software Integration and Test Environment (including configuration management), Applications Support & Maintenance (ASM), and the NCF/helpdesk. While we are introducing a new system, the fundamentals of the overall support systems will not change. Because the basic requirements for SWIT and CM do not change, the general processes and framework will remain largely the same as they are today. Changes will occur mainly in procedure details. For example, some software infrastructure test procedures will change, and other test procedures may not change. We will only change what needs to change because of AWIPS II; we will not perform a wholesale revamp of the O&M systems. Our general principle is to minimize disruption to the current System while meeting the need.

Preliminary deployment and transition plans described in this document assume that OB9 maintenance releases will be limited to critical DRs and RHEL upgrade in order to ensure that appropriate resources are available to support the transition to and preparation for O&M of the new AWIPS II software. After OB9.3 is complete, SMS will be available to do Catastrophic Releases. Generally, a Catastrophic Release involves significant loss of functionality that has no workaround; for example, existing datasets become unavailable; a decoder crashes and cannot be restarted; or messages cannot be transmitted.

The roadmap for O&M Transition is shown in Figure 10-1. It is based on the following assumptions:

- ASM has allocated 80 hours per month, which includes LOE (level of effort) time, coding, and/or research associated with the DR(s).
- SWIT has allocated 32 hours per month, which includes LOE time, testing, and/or any research associated with the DR(s).
- The 32 test hours will cover the 80 hours from ASM.
- Hours allocated are not limited to any specific functional area (GFE, MDL, OHD, etc.)
- Use it or lose it. Any unused hours for any month will not be rolled over.
- Impacts to AWIPS II will have to be assessed for each change request.

SMS will follow its standard Knowledge Acquisition Process (KAP) for the transition to O&M.

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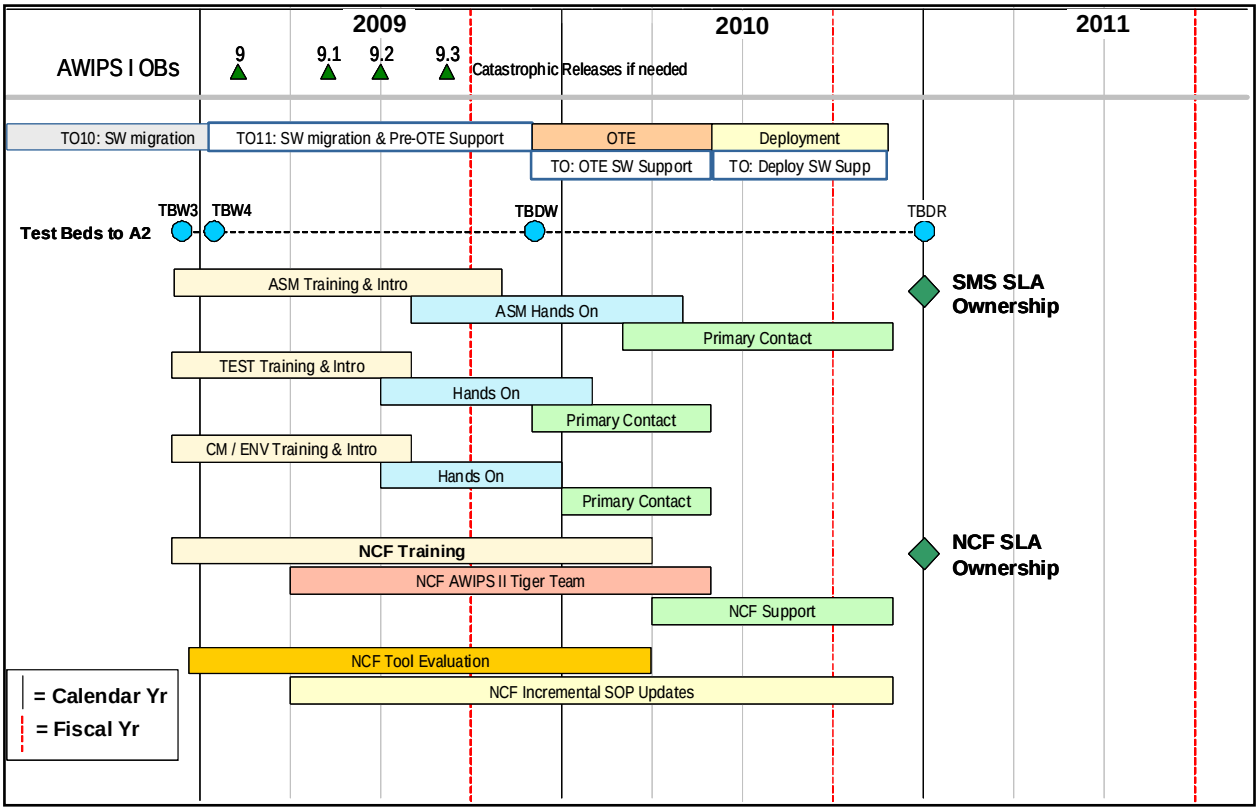

Figure 10-1. O&M Transition

10.1 Release Management

"Release Management" as used here refers to the overall framework of processes beginning with the SREC and ending with delivery. Fundamental release products will not change (for example, release notes, documentation updates). The current release process is shown in Figure 10-2. In examining this figure, it is easy to see why things will not change much at this level of detail.

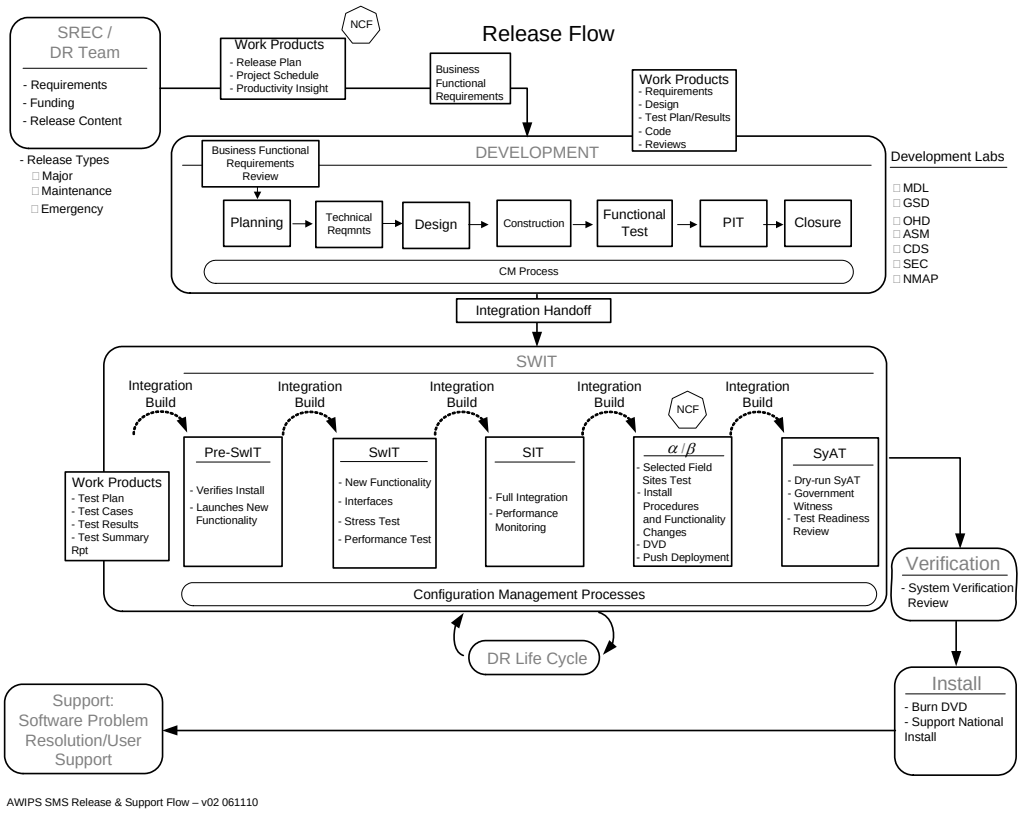

Figure 10-2. AWIPS I Release Management Process

10.2 SWIT, CM, and Test Environment Transition

A description of the transition activities of each phase shown in Figure 10-1 follows.

- KAP Training and Intro
  - SWIT gathers and reviews documents from Omaha (OMA).
  - OMA has full responsibility for execution and results of builds, releases, installs, and tests.
  - OMA and SWIT conduct monthly TIMs, one each for Test, CM, and Environment (ENV).
- KAP Hands-On
  - SWIT works on builds, releases, installs, and tests, with assistance and direction from OMA.
  - SWIT and OMA share responsibility for execution, but OMA retains full responsibility for the results.
  - SWIT modifies procedure documents as required to support the new AWIPS II paradigm.
  - OMA and SWIT conduct weekly TIMs, one each for Test, CM, and ENV.
  - All ENV Trouble Tickets (TT) will be directed to OMA. OMA assigns select TTs to ENV and reviews ENV's proposed resolution. Tickets resolved by OMA will be reviewed by ENV.

- KAP Primary Contact
  - SWIT works on builds, releases, installs, and tests, with OMA reviewing and approving SWIT's work.
  - SWIT has full responsibility for execution, but shares responsibility for results with OMA.
  - OMA and SWIT conduct monthly TIMs, one each for Test, CM, and ENV.
  - All ENV TTs will be directed to ENV, but OMA will review proposed resolutions.
- KAP Completion
  - SWIT takes full responsibility for execution and results of builds, releases, installs, and testing.
  - OMA provides advice only if needed.
  - All ENV TTs will be directed to the ENV.
  - Once ASM takes ownership of AWIPS II, AWIPS I will be archived and locked with the CM tool.

10.3 Application Maintenance

A description of the application maintenance activities of each phase shown on Figure 10-1 follows.

- KAP Training and Intro
  - OMA works on the component with the ASM team watching, asking questions, and taking notes.
  - OMA has full responsibility for execution and results.
  - All TTs will be directed to OMA following existing processes.
  - Phase-In: During this timeframe, some of the ASM developers will be shifting into the KAP Hands-On phase
- KAP Hands-On
  - ASM works on the component, with assistance, direction, and direct supervision from OMA.
  - ASM and OMA share responsibility for execution, but OMA still retains full responsibility for the results.
  - All TTs will be directed to OMA following existing processes.
  - Phase-In: During this timeframe, some of the ASM developers will be shifting into the KAP Primary Contact phase
- KAP Primary Contact
  - ASM works on the component, with OMA reviewing the ASM-proposed approach to the task at hand and with OMA's review and approval of deliverables before installation.
  - ASM has full responsibility for execution but shares responsibility for results with OMA.

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  - All TTs will be directed to ASM following SMS processes, but OMA will assist in reviewing the code.

- SMS Ownership
  - ASM takes full responsibility for both execution and results for the component. OMA provides advice only if needed. All TTs will be directed to the ASM following SMS processes.

10.4 NCF and User Support

The following discussion describes the NCF and user support activities shown in Figure 10-1.

NCF Training will consist of AWIPS II familiarization/operations training for Backline and Frontline staff. Training will focus on what NCF staff needs to be able to Evaluate – Diagnose – Assign – Restore in the AWIPS II world. The Basic Engineering Course will be modified to address AWIPS II changes.

During the transition, we will form an NCF AWIPS II Tiger Team. Each shift will have AWIPS I and AWIPS II dedicated staff. The mix between AWIPS I and AWIPS II will gradually shift until all sites are operational with AWIPS II. Site telephone calls and Trouble Tickets will be parsed to the AWIPS I team or the AWIPS II team. All Trouble Tickets will be escalated as they are today for AWIPS I. NCF will escalate AWIPS II tickets to OMA during OTE. During OTE, the NCF will produce a daily AWIPS II status/troubles report.

The basic tools used by the NCF are not expected to change. The NCF will use Remedy to assign, track, and store tickets distinctly for AWIPS I vs. AWIPS II. OpenView (ITO) will be modified to create templates for items distinct to AWIPS II that might need to be evaluated, tracked, alarmed, etc. The NCF will update its Standard Operating Procedures (SOP) and related processes prior to, during, and after transition as appropriate

10.5 Service Level Agreements (SLA)

The transition of SLAs will be completed as part of O&M Transition. AWIPS II SLAs are still to be determined.

ASM AWIPS I SLAs end at SMS Ownership, and AWIPS II SLAs begin at SMS Ownership. During transition, AWIPS I TTs will take priority over AWIPS II because the AWIPS I SLAs are still in effect. TTs for AWIPS I will be resolved at best effort after SMS Ownership of AWIPS II (example: NCs).

SWIT AWIPS I SLAs end at SMS Ownership, and AWIPS II SLAs begin once SMS begins to lead the activities related to a Major Release.

NCF AWIPS I SLAs end at SMS Ownership, and AWIPS II SLAs begin at SMS Ownership.

10.6 Governance

AWIPS II delivery brings the opportunity to change the release paradigm while enabling easier extension by the Field Operations. This also provides opportunity for problems resulting from uncontrolled change. “Governance” is the term generally used to refer to the rules and processes for managing change to the AWIPS II software environment. As with the rest of O&M transition

the fundamentals shouldn't change that much except for possibly scope and organization participation.

In the big picture, governance is fundamentally concerned with decision making, and for IT systems like AWIPS it generally starts with funding/resource decisions. How much will be spent on "IT"? How will it be spent? Next, governance is concerned with change decisions and related processes such as managing change authorizations to AWIPS II; adding new capability; applying corrective actions; and setting priorities (which is a form of "how to expend resources").

A Governance Vision Team is currently defining governance for AWIPS II. The team has and is reviewing AWIPS I governance processes and procedures for applicability to AWIP II. The Team is currently working the details of governing the AWIPS II Baseline, and will address local application governance once Baseline governance is addressed.

One area of change for AWIPS II is governance of the architecture. Here, "architecture" refers to the executable software that comprises the core infrastructure of the system. It is possible for a software developer to ignore available functionality in the infrastructure and add redundant functionality to the system. Left unchecked, these additions will create maintenance and extensibility issues similar to those that exist with AWIPS I. To avoid this, an "architecture" development/maintenance group needs to be formed separate from "applications" development/maintenance. Design reviews for new applications should be held early in the development cycle (OSIP Gate x) for architectural compliance, for example, not developing redundant infrastructure or services. These reviews may point to the need for changes to the core infrastructure. The architecture maintenance group would perform these changes. The NWS should consider and include the resources to make architecture changes when planning new applications development.

AWIPS II will have configuration management locks that will prevent certain changes to system (by developers whether they are development or field operations organizations).

Local App "Plug-ins" (e.g., CAVE, SOA, data) will be located in a specific directory similar to the Baseline plug-ins (i.e., likely to be a tree structure with a branch terminating with a "base" leaf and an adjacent "local" leaf.) Details will be developed in TO11. Changing to Camel has caused changes to baseline locations.

LA scripts should be located in a Unix standard execution structure on a shared mount from the NAS. This partition would also hold output data and provide a means to contain "runaway" apps from filling disk space outside the partition. This NAS setup may also suffice as an LA Test Environment in the longer term.

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11. Government Testing

The NWS will conduct several types of tests on AWIPS II. These types of testing will include independent validation and verification (IV&V), User Functional Test (UFT), Operational Test and Evaluation (OTE), and (security) certification and accreditation (C&A). Other testing is also being planned (e.g., pre-OTE, RTF). The NWS is responsible for the planning and execution of these tests. However, Raytheon will provide technical support depending on the specific testing. Support may take the form of fixing "work stops," processing trouble tickets, providing DR disposition reports, and assisting in defining performance test procedures. Details of this testing are beyond the scope of this document; however, a few points on each are provided in this section.

Independent Validation and Verification (IV&V)

IV&V started with ADE 0.1 release and will occur throughout the migration period. Raytheon technical support will consist of assisting in defining performance tests, and providing DR disposition reports.

User Functional Test (UFT)

The UFT will occur at the end of TO8, 9, 10, and 11. It is similar to the Pre-Integration Test (PIT) done today for new functionality. It is planned for a nominal three weeks (longer than today's PIT). It will provide for tests of "forecaster functionality" and will be performed by field personnel (e.g., forecasters). The primary purpose of the UFT is to verify that the functionality adequately mimics AWIPS I for end-user functions delivered with a specific TO. Raytheon's technical support will consist of fixing work stops, and providing a DR disposition report for DRs submitted to Raytheon for the UFT.

Operational Test & Evaluation (OTE)

OTE will begin on November 30, 2009. OTE is currently planned for six months. The OTE plan is currently under development by an NWS Integrated Working Team (IWT). Raytheon technical support will consist of normal Trouble Ticket processing, which includes priority resolution of work stops. Note that the AWIPS support organizations will be ready to provide this support when OTE begins (as discussed in Section 10). Raytheon also expects to participate in OTE performance testing definition.

Certification & Accreditation (C&A)

AWIPS (the total system) will go through a C&A update in mid-2008. AWIPS II will be a revision to that C&A plan addressing the AWIPS II software changes. This is expected to be primarily testing of technical controls (e.g., authentication, authorization) of AWIPS II within the security architecture of the AWIPS system (e.g., hardened perimeter). As such it is not expected to be a major departure from the approaches today. C&A can start and occur concurrently with OTE. If the technical controls test is successful, the overall process is expected to take eight weeks.

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Appendix A. AWIPS Software CTR Deployment and Transition Planning: Task Order Outbrief

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Raytheon

Customer Success Is Our Mission

Advanced Weather Interactive Processing System Continuous Technology Refresh

AWIPS Software CTR

Deployment and Transition Planning: Task Order Outbrief

February 24, 2009

AWP.PSN.SWCTR/DTP-01.00

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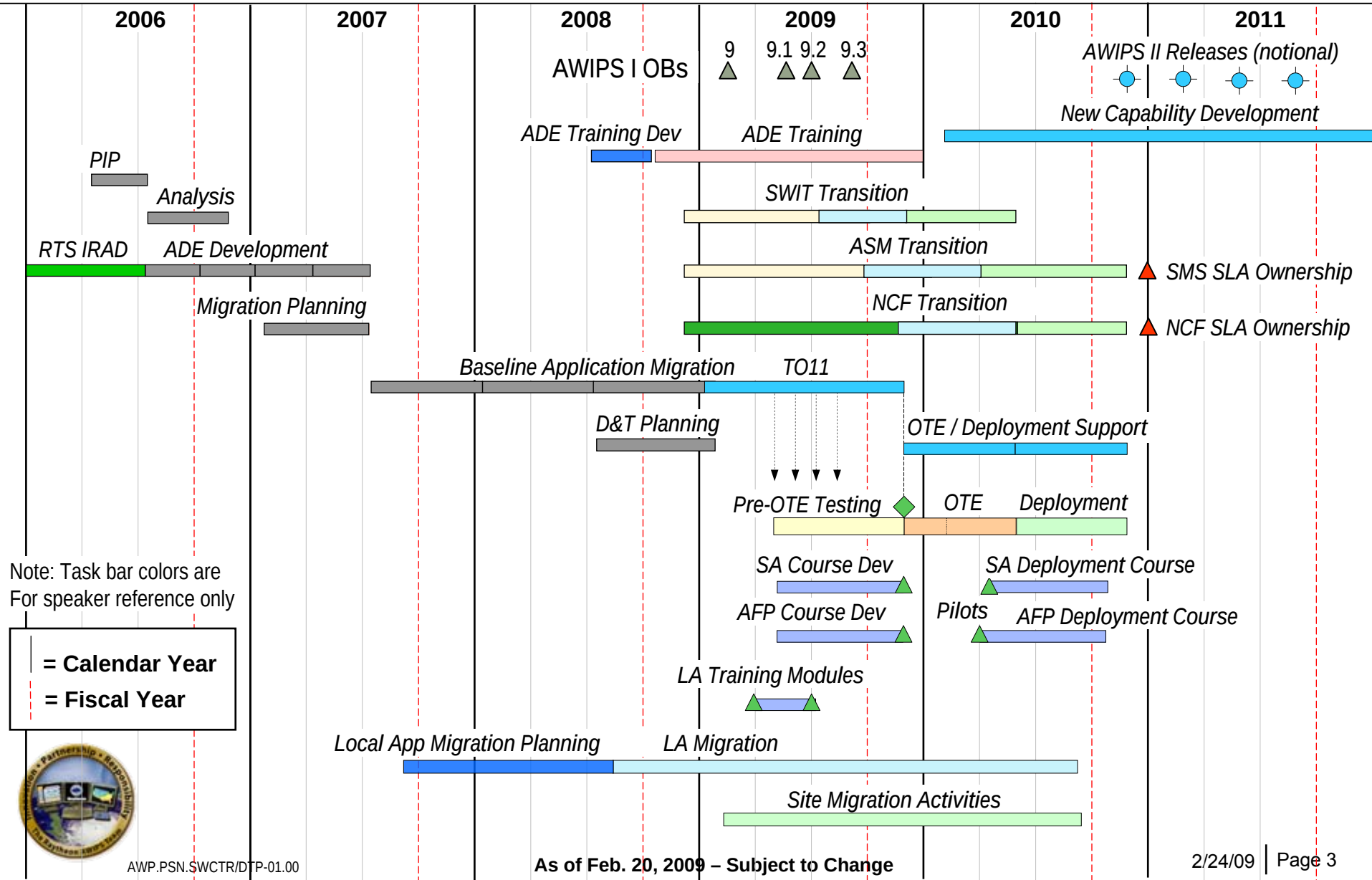
Deployment and Transition *Planning*

- Roadmap Update
- TO11 Approach
- Site Migration
  - Required Preparation
  - Configuration Data ***Migration*** (localization, customization) **!!!**
  - Baseline Application Testing
  - Local Applications Migration
  - Deployment Hardware Configuration
  - Operations Cutover / Rollback **!!!!**
  - Long-Term Hardware Configuration
- Deployment Interoperability
  - Intersite Coordination (ISC)
  - Service Backup **!!!!**
  - MHS / ESB
- Mechanics of Deployment / Installation
- NWSTD Support
- OTE Support
- Post “TO11” Support Task Order Descriptions
- O&M Transition
- Issues, Questions, Implications

AWIPS II Roadmap

Raytheon

Deployment & Transition

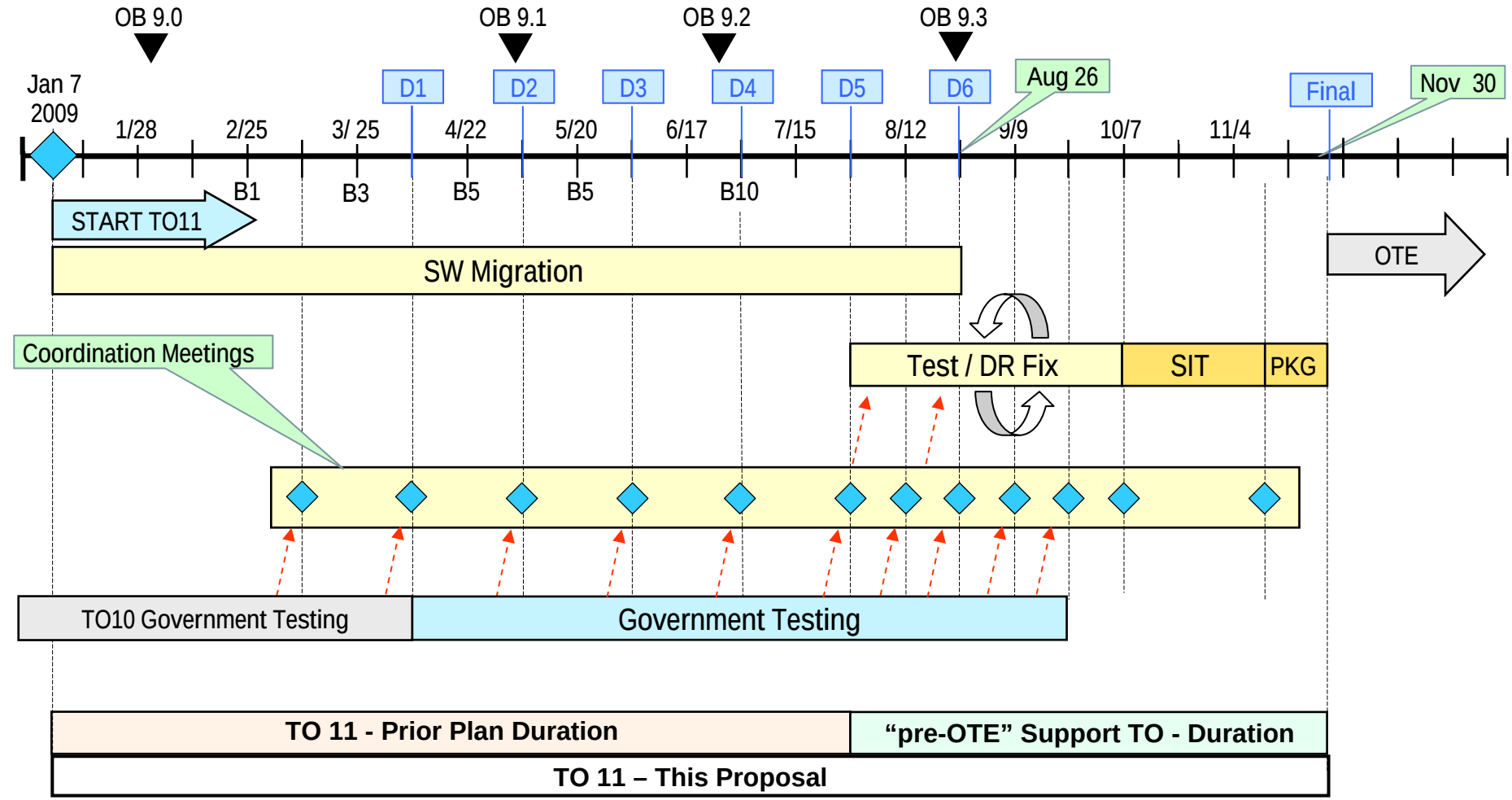


Note: Task bar colors are For speaker reference only

= Calendar Year

= Fiscal Year

AWIPS II TO11 Conceptual Approach



Deployment and Transition Planning

Required Preparation for Site Migration

- Application Software Functionality Testing
  - Ingest: SBN, ORPG, LDAD
  - Product Generation / Dissemination (see checklist slide 9)
- Configuration Data Migration
  - D2D: Added site-specific localizations; site level procedures; volume browser
  - WarnGen Template: Site configurations / customizations
  - River Pro Templates (changes for AWIPS II* not required)
  - GFE / GHG: Text Formatters, site specific configurations
  - AvnFPS
  - Client configurations
- Smart Tools (et al.) Migration
- Local Applications Migration
- HW Needed to Support These Activities
  - Site Migration work must be done prior to Operations Cutover
  - Work cannot be done on an A1 Operational System – disruption risk
  - Standard AWIPS workstation should be sufficient for Site Migration work (shown on previous slide)
    - CAVE and EDEX Installed
  - Assume using canned data (non-SBN data); work details in TO11
- Environment Configuration Migration
  - No New Hardware Required for Initial Deployment
  - Check Configuration: HW, OS, Utilities, Drivers, etc.
- Training: Variances, Sys Admin, Focal Points

**Blue type in the bullet lists of this outbrief denote revisions made since the draft submission in Dec. 2009.*

Deployment and Transition Planning

Configuration Data Migration (Localization, Customization)

- Specific configuration data is required for operations, and includes:
  - Baseline configuration data (e.g., “BASE”)
  - Specific site data (e.g., “SITE”) ← “localization,” text formatter customization
  - Specific user data (e.g., “USER”) ← “customization”
- BASE data included with delivery for all application areas
  - No localization step in installation (e.g., no map and data clipping of “National DB” is required for site)
- Attempting to “preserve” as much Site and User config data as practical
  - Reduce load on Sites in configuring AWIPS II for operation
- SITE data preserved for GFE / IFPServer and Hydro
- Other SITE data, e.g., D2D Procedures / Menus, VB, WarnGen Templates, GFE Formatters, will need manual loading by the Sites (see attached checklist)
- Planning on placing “BASE” and “SITE” localization data in a central repository
  - Extension of Rsync; AWIPS II SW elements exist
  - SITE data updates as occurs
  - Enhances Service Backup since all site data is available to anyone
  - Design / Implementation in TO11; will review design prior to implementation


Data Migration Checklist

Data Migration Checklist

AWIPS-II Migration Tasks			
Migration Task	**Tool**	**Comment**	
Display Bundles and menu XML	Eclipse IDE Plug In Tool	Prototype not part of baseline	***Describe***
Display Procedures	History + Procedure Menu in CAVE	No tool to port existing procedures	
Color Tables	CAVE Color Editor + Perl script to port D2D tables to CAVE XML	Perl script is prototype not part of baseline	
Maps and Scales	Map Creation GUI in CAVE	D2D maps can be reused as is	
Contour style rules	XML	no tool, but mostly done already	***base only; site still localizes***
Graph style rules	XML	no tool, but mostly done already	***base only; site still localizes***
Imagery style rules	XML	no tool, but mostly done already	***base only; site still localizes***
Volume Browser	XML	XML driven Menu, manual edit	***base only; site still localizes***
Derived parameters	Python	Derived parameters are Python Scripts	***base only; site still localizes***
WarnGen Templates	Velocity	Manual port	***Templates get customized by the site***
WarnGen Configuration Files	Text		
GFE Server Configuration	Python		
GFE Editor Configuration	CAVE prefeences		
GFE Text Formatter Scripts	Python		
GFE ISC Config Files	Python		
GFE Smart Init Scripts	Python		
GFE VTEC sharing configuration	Python		
Data Acquistion Filters	None - Text patterns	Manual acq_server to LDM	

Data Migration Checklist

Parameter
TemporalEditorWEMode
MutableModel
dbTypes
DefaultGroup
mask
drtTimeOffset
Zones_labelAttributes
MapBackgrounds_default LegendMode
GridManagerSortOrder
MapBackgrounds_default
MapBackgrounds_availColors
TextFont[0-4]
SystemTimeRange_beforeCurrentTime
SystemTimeRange_afterCurrentTime
Selected_color Selected_fillPattern
TimeScaleLines_color
TimeScaleLines_pattern
EditorTimeLine_color
CurrentSystemTime_color
LockedBy[…]color
TimeBlockVisible_color
LegendMode
ReferenceSet_color
GM_TE_Layout TimeScale_horizSize
States_fontOffset
QuickSetButtons
StatusTimeout MessageLimit
OfficeDomain_expandLeft
T_pencilWidth
DiscreteOverlapPatterns
T_interpolateAlgorithm
SetValue_zoom
HideConfigFile
GridManagerEditActions
ShortCut1
GridManagerSortAlgorithm
InterpolateDefaultInterval
CreateScratchDefaultInterval
T_graphicColor
ProductList
MaxMenuItemsBeforeCascade
ISC_Sites
SendISCGridsWhenSave
T_Sample_color
T_Legend_color

Data Migration Checklist

Parameter
SampleShadow_color
SampleLabel[X|Y]Offset
SampleParms
AltWxSampleLabels_prettyWx
ShowISCUpdateTime …
SEColorBar_tickColor…
Wx_AdditionalColorBarLabels
ContourSubSample
PencilToolInfluence_list
Smooth[Size|List]
SEZoomFactor
Sky_MaxDeltaDialogValue
InterpolateDialogMode
Generic_colors
Wx_temporalDataPaneSize
T_contourInterval
States_graphicColor…
EditActionDialog_Xcoord..
GM_TE_Layout
SampleLLPlus_color
ImageLegend_color
ColorBarScale_font…
BoundedArea_font
HistoryUser…
WEList
DefaultSamples
AllEditActionsOnPopUp
EditAreaGroups
AutoSaveInterval
PublishTimes
bgColor
ShowSampleShadows
T_lineWidth
T_fontOffset
T_density
T_linePattern
T_deltaValue
WindArrowDefaultSize
Wind_arrowScaling…
WindFormat..
ZL_defaultCoverage
T_maxColorTableValue
MissingDataMode
SelectGridsWhenStepping
TimeScalePeriods
T_spatialImageType
BoundedArea_Labels…
Wx_commonValues
T_defaultColorTable
Sky_defaultColorTable

Data Migration Checklist

Parameter
T_fitToDataColorTable
T_ColorBarLables
WeatherCoverage_names…
ImageOnActiveSE…
ShowEmptyEditAreaWarning
MapLabel[X|Y]Offset
ISC_sendLimitBeforeCurrentTime
ISC_neverSendParms
SendISCGridsWhenAutoSave
InitialGMDisplayMode
ScriptsDialog_Processor
WxDiscrete_Description
ProductOutputDialog_font…
ProcessMonitor…
Saved_minutes…
ZoneCombiner_...
ProductEditorDirectory

Data Migration Checklist

	NOTES	AWIPS II equivalent capability (Y - N) plus description	User method to modify config	Where is config data stored?	BASE Preserved (Y/N)	SITE Preserved (Y/N)	USER Preserved (Y/N)	Existing / Planned (E, P)	User Conversion Tool Available? (Y/N)
SMM 15.0 D2D related Localization	From the SMM: The localization process is designed to provide a satisfactory version of the site-specific data required to support operations at a local office based on a single national configuration data set. The national configuration data set currently contains information about counties, cities, zones, topography, rivers, etc.,	General comment for localization (loc)							
National DB Localization		Not Required							
Radar Display and Menu Files	SMM 15.9, see SMM 7.1.1								
Kxxx Radar Menu		(Y) plugin.xml (loc)	edit	EDEX Loc.	Y	N	N	E	N
RPG Access Configuration Files (Adding or Removing an RPG)		(Y) being designed T010	edit	EDEX	Y	Y	Y	E	N
Radar Display (Mosaic) Files		(Y) haven't worked yet		EDEX Loc.	Y	N	N	P	N
Radar Menu Files	See dtp/WarnGenCustomizationItems2.doc	(Y) plugin.xml (loc)	edit	EDEX Loc.	Y	N	N	E	N
WarnGen Localization									
Modifying Default WarnGen Station ID		(Y) AWIPS-II CAVE (loc) perferences sets stations id	CAVE menu	CAVE	N	N	N	E	N
WarnGen Full Backup Localization		(Y) T011						P	
Product Templates for WarnGen		(Y) Velocity Templates	edit	CAVE	Y	N	N	E	N
WWA Segmented and Non-Segmented Products									
SAFESEAS Localization		(Y) T011							
Modifying Shapefiles and Area Files		(Y) T011							
Marine Zone Shapefiles for WWA and SAFESEAS		(Y) T011		EDEX Loc.	Y	Y	Y	P	N

Data Migration Checklist

	NOTES	AWIPS II equivalent capability (Y - N) plus description	User method to modify config	Where is config data stored?	BASE Preserved (Y/N)	SITE Preserved (Y/N)	USER Preserved (Y/N)	Existing / Planned (E, P)	User Conversion Tool Available? (Y/N)
Scripts									
METAR Data									
Adding METAR Data to the Text Database		(Y) LDM patterns (on CPs)	edit	CP	Y	N	N	E	N
Adding METAR Data to the Text Database Using national_category_table .template		N/A AWIPS-II is automatic						E	N
Plotting METAR Observations on AWIPS		N/A auto display if ingested			Y	N	N	E	N
Displaying New Maritime Station Data		N/A auto display if ingested			Y	N	N	E	N
Checking for Product Duplication		N/A auto display if ingested			Y	N	N	E	N
MSAS Localization		(Y) T011							
SCAN Localization		(Y) T011							
Switch Changes		(Y) T011							
Functionality		(Y) T011							
Dependencies		(Y) T011							
Localization Lists		(Y) T011							
FFMP Relocalization		(Y) T011							
SMM 16.0 Customization	From the SMM: Customization refers to all changes made to the system that are not required for site operation. Customization includes changing the order of list items on a menu, changing the colors of the display, etc.								
Modifying D2D Defaults									
How to Change D2D Interface Defaults	ws.config Text File: Map background default color, loop controls, and frame counts are some of the parameters that can be changed	(Y) plugin.xml served by localization pattern (loc)	edit	CAVE	Y	N	N	E	N
Changing the Default Scales in the Large		(Y) plugin.xml	edit	CAVE	Y	N	N	E	N

Data Migration Checklist

	NOTES	AWIPS II equivalent capability (Y - N) plus description	User method to modify config	Where is config data stored?	BASE Preserved (Y/N)	SITE Preserved (Y/N)	USER Preserved (Y/N)	Existing / Planned (E, P)	User Conversion Tool Available? (Y/N)
and Small Panes									
Modifying Default Contour Styles		(Y) XML served out by localization (loc)	edit	CAVE	Y	N	N	E	N
Modifying Default Gridded Image Styles		(Y) XML served out by localization	edit	CAVE	Y	N	N	E	N
Changing Entries in the QCMS Reject and Accept Lists		(Y) T011							
How to Add or Delete a Product from the Data Monitor		N/A							
Making Latitude/ Longitude Lines Show up on Maps by Default		(Y)		CAVE				E	N
Using fxaAnnounce to Notify Users of Events		N/A replaced by Gaurdian and Gaurdian config	Gaurdian GUI	Gaurdian	Y	N	N	E	N
Customizing Displays on D2D									
Adding Sites to D2D Pull-Down Menus		(Y) plugin.xml (loc)	Edit	CAVE	Y	N	N	E	N
Adding the Ability to Display Spotter Locations on D2D		(Y) Reuse AWIPS-I							
Modifying Profiler Sites on the Upper Air Pull-Down Menu		(Y) plugin.xml (loc)	Edit	CAVE	Y	N	N	E	N
Radar Customization									
How to Change the Default RPS Lists		(Y) Reuse AWIPS-I		EDEX	Y	Y	Y	E	N
Creating Radar-Specific Pre-localization RPS Lists		(Y) Reuse AWIPS-I	CAVE Gui	EDEX	Y	Y	Y	E	N
Adding Radar 4-Panel Displays		(Y) plugin.xml (loc)	edit	CAVE	Y	N	N	E	N

Data Migration Checklist

	NOTES	AWIPS II equivalent capability (Y - N) plus description	User method to modify config	Where is config data stored?	BASE Preserved (Y/N)	SITE Preserved (Y/N)	USER Preserved (Y/N)	Existing / Planned (E, P)	User Conversion Tool Available? (Y/N)
Changing Default Color Enhancements for Radar Imagery		(Y) CAVE static data (loc)	CAVE color editor	CAVE	Y	N	N	E	Y
Modifying the Default Radar Color Curves		(Y) CAVE static data (loc)	CAVE color editor	CAVE	Y	N	N	E	Y
Satellite Imagery Customization									
Modifying the Default Brightness of Satellite Images		(Y) T011							
Fog Product Generation		(Y) T011							
Text Customization									
Modifying the Default Origination Node in the Text Editor		(Y) CAVE preferences	CAVE Menu	CAVE	N	N	N	E	N
Add Versions to Text Database		(Y) Same as AWIPS-I	CLI	EDEX	Y	Y	N	P	Y
Adding Products to the Text Browser		?							
Update the afos2awips.txt file		(Y) ?							
Adding Products to the textOfficeMenus.txt File		?							
SCAN Customization		(Y) T011							
SMM 9.0 Background Applications									
Climate									
Configuration Files and Environment Variables		(Y) T011							
Climatological Reports Formatter Setup		(Y) T011							
Configure Global Climate Parameters		(Y) T011							

Data Migration Checklist

	NOTES	AWIPS II equivalent capability (Y - N) plus description	User method to modify config	Where is config data stored?	BASE Preserved (Y/N)	SITE Preserved (Y/N)	USER Preserved (Y/N)	Existing / Planned (E, P)	User Conversion Tool Available? (Y/N)
Establishing the Historical Database		(Y) T011							
Configuring Products		(Y) T011							
Report Type, Report Configuration, Select Stations for Product		(Y) T011							
Weather Elements		(Y) T011							
Record Climate		(Y) T011							
Configuration Files and Environment Variables		(Y) T011							
Hourly Weather Roundup Formatter for NWWS		(Y) T011							
Configuration Files and Environment Variables		(Y) T011							
Setting up the HWR NWWS Application		(Y) T011							
Identify the Products to be Produced		(Y) T011							
Setting Up the HWR NWWS Application		(Y) T011							
Creating a Station List		(Y) T011							
Updating Station PILs		(Y) T011							
Hourly Weather Roundup Formatter for NOAA Weather Radio		(Y) T011							
Configuration Files and Environment Variables		(Y) T011							
Setting up the HWR NWR Application		(Y) T011							
Identifying the Products to be Created		(Y) T011							
Selecting the HWR NWR GUI Options		(Y) T011							

Data Migration Checklist

	NOTES	AWIPS II equivalent capability (Y - N) plus description	User method to modify config	Where is config data stored?	BASE Preserved (Y/N)	SITE Preserved (Y/N)	USER Preserved (Y/N)	Existing / Planned (E, P)	User Conversion Tool Available? (Y/N)
Creating a Station List		(Y) T011							
Creating a Broadcast Format File		(Y) T011							
Creating a Default Format File		(Y) T011							
Providing Additional Variability for the NWR Broadcasts		(Y) T011							
NWR Editor Setup and Configuration		(Y) T011							
AvnFPS									
Configuring AvnFPS									
Files in etc									
TAF Configuration Files		(Y) XML format in CAVE	GUI	CAVE	Y	N	N	E	N
TWEB Configuration Files		N/A TWEBs are gone							
X Resources Configuration Files		N/A X is gone							
Climatological Data		(Y) Same as AWIPS-I	GUI	CAVE	Y	N	N	E	N
Avnsetup									
Editing Monitoring Rules		(Y) Same GUI as AWIP-I	GUI	CAVE	Y	N	N	E	N
Editing AvnFPS TAF Site Information		(Y) Same GUI as AWIP-I	GUI	CAVE	Y	N	N	E	N
Editing AvnFPS TAF Site Templates		(Y) Same GUI as AWIP-I	GUI	CAVE	Y	N	N	E	N
Editing AvnFPS TAF Product Definition		(Y) Same GUI as AWIP-I	GUI	CAVE	Y	N	N	E	N
Editing TWEB Route Information using AvnFPS		N/A TWEBs are gone							
Editing the AvnFPS TWEB Route Template		N/A TWEBs are gone							
Editing TWEB Product Definition using AvnFPS		N/A TWEBs are gone							
Creating		(Y) AWIPS-II		CAVE	Y	N	N	E	N

Data Migration Checklist

	NOTES	AWIPS II equivalent capability (Y - N) plus description	User method to modify config	Where is config data stored?	BASE Preserved (Y/N)	SITE Preserved (Y/N)	USER Preserved (Y/N)	Existing / Planned (E, P)	User Conversion Tool Available? (Y/N)
AvnFPS Database Triggers		Alerts Automatic							
Using the AvnFPS Text Editor		(Y) Same GUI as AWIP-I	GUI	CAVE	Y	N	N	E	N
Configuring IFPS to Send Gridded Data to AvnFPS		(Y) T011							
LDAD	SMM 8.3 PX Config files	(Y) T011							
Async Product Scheduler	SMM 10.1.1	? Obsolete ?							
MHS (14.2.1)	SMM !4.2.1	(Y) T011							
Triggers	Generally replaced by Subscriptions. What has to be done to implement these as subscriptions? Can configuration data be preserved/converted?								
PILS trigger mechanism?		(Y) T010 Subscrption							N
Real Time		(Y) T010 Subscrption							N
DATABASE	SMM 12.10	(Y) T010 Subscrption							N
Text Triggers localization	SMM 15.6.1	(Y) T010 Subscrption							N
Xyplex (SMM 20.9)	SMM 20.9	?							
GFE Localization / customization / Configuration	GFE config data located at: http://www-md.fsl.noaa.gov/eft/AWIPS/ob7.2a/doc/onlinehelp/GFESuiteConfiguration.html more config info than shown here	GFESuite Documentation							
Text Formatters			edit	EDEX	Y	N	N	E	N
Templates	http://www-md.fsl.noaa.gov/eft/AWIPS/ob7.2a/doc/onlinehelp/GFESuiteServerConfiguration.html		edit	EDEX	Y	N	N	E	N
IFPS Server Configuration	General description describing how the ifpServer is configured.								
General Description	Description of the serverConfig configuration file.	General Description							
Syntax for serverConfig.py	Description of the site modification file to serverConfig.	Syntax for serverConfig.py	edit	EDEX	Y	Y	Y	E	N

Data Migration Checklist

	NOTES	AWIPS II equivalent capability (Y - N) plus description	User method to modify config	Where is config data stored?	BASE Preserved (Y/N)	SITE Preserved (Y/N)	USER Preserved (Y/N)	Existing / Planned (E, P)	User Conversion Tool Available? (Y/N)
Syntax for localConfig.py	Override file for the Wx (Weather) definition.	Syntax for localConfig.py	edit	EDEX	Y	Y	Y	E	N
Syntax for localWxConfig.py	Baseline map background configuration file.	Syntax for localWxConfig.py	edit	EDEX	Y	Y	Y	E	N
Syntax for Maps.py	Baseline map background shapefile name configuration file.	(Y) T011							
Syntax for MapFiles.py	Override file for using different (e.g., updated) shapefiles for map backgrounds.	(Y) T011							
Syntax for localMapFiles.py	Override file for customizing map backgrounds.	(Y) T011							
Syntax for localMaps.py	VTEC configuration for coordination and decoding.	(Y) T011							
Syntax for VTECPartners.py	Override file for the VTEC configuration.	Syntax for VTECPartners.py	edit	EDEX	Y	N	N	E	N
Syntax for localVTECPartners.py	Description of the "D2D" netCDF file convention.	Syntax for localVTECPartners.py	edit	EDEX	Y	N	N	E	N
Description of ifpServer required netCDF Format		Description of ifpServer required netCDF Format							
	http://www-md.fsl.noaa.gov/eft/AWIPS/ob7.2a/doc/onlinehelp/gfeConfig.html								
GFE/ifpIMAGE Config file	What happens today with a new OB?	? ifpIMAGE not in AWIPS-II							
GHG configurations									
GFE Client Configuration	I think all configuration of the client is done through GFE dialogues IS THIS TRUE?	General Comment on GFE Client Configurability.		CAVE	Y	N	N	P	N
Hydro	Will ALL configuration data be preserved, ie BASE, SITE and USER								
Where is the configuration data for hydro apps?		Hydro is configured through token files served out by localization pattern	edit	EDEX	Y	Y	N	E	N
What are the current methods?		Token files	edit	EDEX	Y	Y	N	E	N
RFS data is in database									

Data Migration Checklist

Site Migration

from SMM	Directories containing configuration data; does not include everything such as GFE
data/fxa	
/rps-lists	User RP lists by UID
/scripts	User scripts for loading products into text workstations
/siteConfig	Used for site-specific files
/userSkewTs	AWIPS user
/usrPrefs	AWIPS user preferences files
/ldadScheduler	Local Data Schedule
/Grid/sbn/netDCF/local	GFE and MPE templates
/radar/lists	KXXX.maint, .storm, .clear-air, or current. These are RPS lists assigned to default for each site listed.
/LDAD/data	data config files
/usr	on DX, PX, CP, XT…
/usr/local	
from GFE Suite doc	many more config files listed on the site
on IFPServer	
awips/GFESuite/primary/data/databases	
/BASE/*	
/SITE/*	How do we get site specific data?
/USER/*	

Deployment and Transition Planning

Configuration Data Migration (Localization, Customization) (cont'd)

- Vast majority "USER" customization is done via GUIs
  – Users will need to enter this data manually for migration
- D2D Procedure migration will be manual
  – Color-table converter will help reduce time-consuming color matching
- Details of configuring the apps to be developed in TO11 are TBD; anticipate same approach to localization and customization
- Detailed procedures for localization and customization for specific applications will be provided with the related Task Order
- No migration tools beyond what is listed on the "Migration Tab of the Migration Spreadsheet" (slide 6)
- Validate / Test approaches as part of SW development Task Orders (10 & 11)

Deployment and Transition Planning

Baseline Application Testing at the Site

- Assume Lab Testing, RTF Testing, System OTE testing occurs at locations outside the sites
- Site Does:
  - Ad Hoc testing
  - Site configuration testing
  - Site OTE Testing
- Attached Checklist provided as an aid and contains:
  - Environmental Monitoring, Product Generation, Product Dissemination Functions
  - Infrastructure
  - Communications
  - Data
  - NWS Official Products
- Checklist also useful for data migration
- Site can add to the spreadsheet for its own purposes

AWIPS CHECKLIST

Raw List

Green=Crucial
Black=major
Red=minor

Environmental Monitoring Functionality:
Aviation Forecast Preparation System (AVNFPS).
D2D Display capability
D2D Volume Browser display of In-situ Observational Data
D2D Volume Browser display of Numerical Model Guidance.
D2D Volume Browser display of Radar Imagery.
D2D Volume Browser display of Satellite Imagery
Flash Flood Guidance System (FFGS).
Flash Flood Monitoring Prediction (FFMP).
Fog Monitor
Guardian.
HazCollect.
HydroBase Manager.
HydroView.
Integrated Hydrologic Forecast System Database (IHFS).
Local Analysis and Prediction System (LAPS).
Local AWIPS MOS Program (LAMP).
Mesoscale Analysis and Prediction System (MAPS) Surface Assimilation System (MSAS).
Pre-LAMP.
Product maker
Redbook Graphic displays of NCEP products.
River Forecast System (RFS).
Site Specific Hydrologic Prediction Function.
System for Convection Analysis and Nowcasting (SCAN).
System for Nowcasting of Winter Weather (SNOW).
System on AWIPS for Forecasting and Evaluation of Seas and Lakes (SAFESEAS).
Infrastructure Functionality:
Acquisition Server.
Archival and Backup of system data.
Automatic and manual Failover of Servers and Processors.
AWIPS System Monitor.
AWIPS System Monitor.
Comms Router.
Cron management (baseline)
Cron management (local)
Dam Catalog Data Management
Data Controller.
Decoders for text, gridded, point and imagery products (partial)
Decoders for text, gridded, point and imagery products (partial).
Efficient purging processing for data and databases.
Full AWIPS Service Backup.
HandleGeneric
IFPS Service Backup.
IGC Process
Localization (partial)
Localization (partial)
Metar2shef.
Nationally managed firewall.

NCF Archive access.
NCF Archive access.
Notification Server.
PostgreSQL database.
Radar decoder/storage - RadarStorage
Radar Message Handler.
RadarServer.
SBN Retransmission
Text Alarm/Alert.
Text Triggers.
WarnGen Service Backup.
WFO and RFC Archive Servers.

Product Generation Functionality:

Aviation Forecast Preparation System (AVNFPS).
Climate.
Dam Break Model
Graphical Forecast Environmental Suite (GFESuite).
Graphical Hazards Generation (GHG)
Hourly Weather Roundup.
Interactive Forecast Preparation System (IFPS).
Local Storm Reporting (LSR)
Multi-sensor Precipitation Estimator.
NMAP
NOAA Weather Radio Editor.
NWRWAVES Formatters.
RFC Forecast Verification.
River Forecast System Data Visualization.
River Forecast System Extended Streamflow Prediction (RFS ESP).
River Pro.
WarnGen.

Product Dissemination Functionality:

Administrative Message Handling System.
Asynchronous Product Scheduler.
DialServer.
Local Data Acquisition and Dissemination (LDAD).
NOAA Weather Radio (NWR) Interface.
NOAA Weather Wire Service (NWWS) Interface.
NWWS Scheduler.
ORPGCommsMgr.
RMRServer.
WAN Message Handling System.
Web Dissemination

Communications Functionality:

Acquire and decode centrally distributed radar products at operational sites.
Acquire and decode centrally distributed radar products at operational sites.
Acquire and distribute NCEP GRIB and GRIB2 products at the NCF.
Acquire and distribute NWSTG products at NCF.
Acquire and distribute satellite imagery at the Network Control Facility (NCF).

Acquire Graphics products at operational sites.
Acquire NESDIS, GOES, POES and QUIKSCAT products at operational sites.
Acquire NWSTG products at operational sites.
Acquire Text products at operational sites.
Automatic RPS List Transmission.
Establish Dial-Up WSR-88D Connection.
Establish Dial-Up WSR-88D Connection.
Manually send RPS list to WSR-88D/TDWR.

Data:

Aircraft Communications Addressing and Reporting System (ACARS) products
Buoy and ship observations
Graphical NCEP forecast products.
Gridded and point Numerical Model Guidance from NCEP.
Gridded and point remotely sensed observational data.
Gridded and point remotely sensed observational data.
Gridded and text WSR 88D Radar products.
In-situ point observational data, e.g. METAR.
Lightning data.
Meso-net data
Model Sounding products
Nationally Managed Data.
Nationally Managed Shapefiles.
Non-NCEP sources of gridded and point Numerical Model Guidance
NWS official text forecast products.
Profiler products
Satellite and Model soundings.
Satellite and Model soundings.
Satellite imagery.
Upper air point observational data.
WSR-88D products.
Gridded and point Numerical Model Guidance from NCEP.

AWIPS CHECKLIST	Functionality	
EM=Environmental Monitoring PG=Product Generation PD=Product Dissemination	Green=Crucial Black=major Red=minor	
D2D Display capability	EM	
D2D Volume Browser display of In-situ Observational Data	EM	
D2D Volume Browser display of Numerical Model Guidance	EM	
D2D Volume Browser display of Radar Imagery	EM	
D2D Volume Browser display of Satellite Imagery	EM	
Flash Flood Guidance System (FFGS)	EM	hydroview
Flash Flood Monitoring Prediction (FFMP)	EM	
Fog Monitor	EM	
Guardian	EM	
HazCollect	EM	
HydroBase Manager	EM	
HydroView	EM	
Integrated Hydrologic Forecast System Database (IHFS)	EM	
Local Analysis and Prediction System (LAPS)	EM	
Local AWIPS MOS Program (LAMP)	EM	
Mesoscale Analysis and Prediction System (MAPS) Surface Assimilation System (MSAS)	EM	
Pre-LAMP	EM	
Product maker	EM	
Redbook Graphic displays of NCEP products	EM	
River Forecast System (RFS)	EM	
Site Specific Hydrologic Prediction Function	EM	?
System for Convection Analysis and Nowcasting (SCAN)	EM	
System for Nowcasting of Winter Weather (SNOW)	EM	
System on AWIPS for Forecasting and Evaluation of Seas and Lakes (SAFESEAS)	EM	
Aviation Forecast Preparation System (AVNFPS)	EM, PG	
Climate	PG	
Dam Break Model	PG	
Graphical Forecast Environmental Suite (GFESuite)	PG	
Graphical Hazards Generation (GHG)	PG	
Hourly Weather Roundup	PG	
Local Storm Reporting (LSR)	PG	
Multi-sensor Precipitation Estimator	PG	
NMAP	PG	
NOAA Weather Radio Editor	PG	
NWRWAVES Formatters	PG	
RFC Forecast Verification	PG	
River Forecast System Data Visualization	PG	
River Forecast System Extended Streamflow Prediction (RFS ESP)	PG	
RiverPro	PG	
WarnGen	PG	
Administrative Message Handling System	PD	
Asynchronous Product Scheduler	PD	OBE
DialServer	PD	
Local Data Acquisition and Dissemination (LDAD)	PD	
NOAA Weather Radio (NWR) Interface	PD	

AWIPS CHECKLIST	Functionality
NOAA Weather Wire Service (NWWS) Interface	PD
NWWS Scheduler	PD
ORPGCommsMgr	PD
RMRServer (Radar Multiproduct request?)	PD
WAN Message Handling System. (MHS)	PD
Web Dissemination	PD

DATA=Data

Green=Crucial
Black=major

Aircraft Communications Addressing and Reporting System (ACARS) products	DATA
Buoy and ship observations	DATA
Graphical NCEP forecast products.	DATA
Gridded and point Numerical Model Guidance from NCEP.	DATA
Gridded and point remotely sensed observational data.	DATA
Gridded and text WSR 88D Radar products.	DATA
In-situ point observational data, e.g. METAR.	DATA
Lightning data.	DATA
Meso-net data	DATA
Model Sounding products	DATA
Nationally Managed Data.	DATA
Nationally Managed Shapefiles.	DATA
Non-NCEP sources of gridded and point Numerical Model Guidance	DATA
NWS official text forecast products.	DATA
Profiler products	DATA
Satellite and Model soundings.	DATA
Satellite imagery.	DATA
Upper air point observational data.	DATA
WSR-88D products.	DATA

AWIPS CHECKLIST — Infrastructure

IF=Infrastructure
COMM=Communications

Green=Crucial
Black=major

Acquisition Server.	IF	OBE
Archival and Backup of system data.	IF	
Automatic and manual Failover of Servers and Processors.	IF	OBE
AWIPS System Monitor.	IF	
Comms Router.	IF	OBE
Cron management (base and local)	IF	
Dam Catalog Data Management	IF	?
Data Controller.	IF	OBE
Decoders for text, gridded, point and imagery products (partial).	IF	
Efficient purging processing for data and databases.	IF	
Full AWIPS **Service Backup (RiverPro, AvnFPS, GFE, WarnGen)**	IF	
HandleGeneric	IF	?
IFPS **Service Backup.**	IF	
IGC Process	IF	?
Localization (base)	IF	OBE
Localization (site unique)	IF	
Metar2shef.	IF	
Nationally managed firewall.	IF	OOS
NCF Archive access.	IF	WFO?
Notification Server.	IF	
PostgreSQL database.	IF	
Radar decoder/storage - RadarStorage	IF	
Radar Message Handler.	IF	
RadarServer.	IF	
SBN Retransmission	IF	
Text Alarm/Alert.	IF	
Text Triggers	IF	
WarnGen **Service Backup.**	IF	
WFO and RFC Archive Servers (WaX, RaX)	IF	
Acquire and decode centrally distributed radar products at operational sites	COMM	
Acquire and distribute NCEP GRIB and GRIB2 products at the NCF	COMM	
Acquire and distribute NWSTG products at NCF	COMM	
Acquire and distribute satellite imagery at the NCF	COMM	
Acquire Graphics products at operational sites.	COMM	
Acquire NESDIS, GOES, POES and QUIKSCAT products at operational sites.	COMM	
Acquire NWSTG products at operational sites.	COMM	
Acquire Text products at operational sites.	COMM	

Automatic RPS List Transmission.	COMM
Establish Dial-Up WSR-88D Connection.	COMM
Manually send RPS list to WSR-88D/TDWR.	COMM

Weather Forecast Office (WFO) Generated Products, 12/27/2007	Product Identifier	Primary App	Alternative App	Site Customized? (Y/N)	Site Tested? (Y/N)
Aviation Services	AWW	AVNFPS			
Aviation Services	TAF	AVNFPS			
Aviation Services	CWA *(@CWSU's)*	AVNFPS			
Aviation Services	MIS *(@CWSU's)*	AVNFPS			
Aviation Services	VFT	AVNFPS			
Aviation Services	FAO *(@Honolulu WFO)*	Text Workstation Editor			
Aviation Services	RFR *(@Honolulu WFO)*	Text Workstation Editor			
Aviation Services	SIG *(@Honolulu WFO) (SIGMET)*	Text Workstation Editor			
Aviation Services	WAO (@Honolulu WFO) (AIRMET)	Text Workstation Editor			
Aviation Services	WST - Tropical Significant Meteorological Advisories SIGMET WFO Honolulu	Text Workstation Editor			
Aviation Services	WSV Volcanic Ash Significant Meteorological Advisories SIGMET WFO Honolulu	Text Workstation Editor			
Climate Services	CLM	Climate			
Climate Services	F-6	Climate			
Climate Services	RER - Record Event Report	Climate			
Climate Services	CLI	Climate			
Drought Services	DGT - Drought Information Statement	Text Editor			
Hydrologic Services	Gridded Snow Amount Forecast	GFE			
Hydrologic Services	Gridded Quantitative Precipitation Forecast	GFE			
Hydrologic Services	FFA - Areal Flood Watch	GFE; GHG			
Hydrologic Services	FFA - Flood Watch for Forecast Points	RiverPro			
Hydrologic Services	FLS - Flood Statement - Flood Advisory for Forecast Points	RiverPro			
Hydrologic Services	FLS - Flood Statement –Follow up to Flood Warning for Forecast Points	RiverPro			

Weather Forecast Office (WFO) Generated Products, 12/27/2007	Product Identifier	Primary App	Alternative App	Site Customized? (Y/N)	Site Tested? (Y/N)
Hydrologic Services	FLW - Flood Warning for Forecast Points	RiverPro			
Hydrologic Services	ESF - Hydrologic Outlook	RiverPro / Text Editor			
Hydrologic Services	RR1, RR2, RR3, RR4, RR5, RR7, RR8, RRM, RRA - Hydrometeorological Data Products	Text Editor			
Hydrologic Services	RVA - Hydrologic Summary	RiverPro	Text Editor		
Hydrologic Services	RVD - River and Lake Forecast Product	RiverPro	Text Editor		
Hydrologic Services	RVS - Hydrologic Statement	RiverPro	Text Editor		
Hydrologic Services	HCM - Hydrometeorological Coordination Message	Text Editor?			
Hydrologic Services	HYD, HYW, HYM - Daily, Weekly, and Monthly Hydrometeorological Summary	Text Editor?			
Hydrologic Services	FFS - Flash Flood Statement	WarnGen			
Hydrologic Services	FFW - Flash Flood Warning	WarnGen			
Hydrologic Services	FLS - Flood Statement – Areal Advisory	WarnGen			
Hydrologic Services	FLS - Flood Statement – Follow-up to Areal Flood Warning	WarnGen			
Hydrologic Services	FLW - Areal Flood Warning	WarnGen			
Marine Services	OFF - Offshore PR+AR	GFE			
Marine Services	Gridded Significant Wave Height	GFE			
Marine Services	CFW - Coastal/Lake-shore Hazard Message	GFE; GHG			
Marine Services	CWF - Coastal Waters Forecast	GFE; GHG			
Marine Services	GLF - Open Lakes Forecast (Great Lakes Offices Only)	GFE; GHG			
Marine Services	MWW - Marine Weather Warning	GFE; GHG			
Marine Services	NSH - Nearshore Forecast	GFE; GHG			
Marine Services	CPF - Coded Port Forecast Experimental Great Lakes Only	Text Editor			

Weather Forecast Office (WFO) Generated Products, 12/27/2007	Product Identifier	Primary App	Alternative App	Site Customized? (Y/N)	Site Tested? (Y/N)
Marine Services	FBO - Great Lakes Break-up Outlook for the Opening of Navigation (Cleveland Only)	Text Editor			
Marine Services	FBO - Great Lakes Ice Freeze Up Outlook	Text Editor			
Marine Services	GLS - Great Lakes Storm Summary (Cleveland Only)	Text Editor			
Marine Services	GLM - MARMON - Great Lakes Monitoring Message	Text Editor			
Marine Services	HSF - High Seas Forecast (Honolulu Only)	Text Editor			
Marine Services	ICE - St. Lawrence Freeze Up OutlookBuffalo Only	Text Editor			
Marine Services	LIO - Great Lakes Ice Outlook	Text Editor			
Marine Services	MAFOR	Text Editor			
Marine Services	MAW - Great Lakes Marine Alert Message (Cleveland Only)	Text Editor			
Marine Services	OFF - NAVTEX PR + AR	Text Editor			
Marine Services	OMR - Great Lakes Marine Weather Broadcast	Text Editor			
Marine Services	SRF - Surf Zone Forecast	Text Editor			
Marine Services	SMW - Special Marine Warning	WarnGen			
Marine Services	MWS - Marine Weather Statement	WarnGen for SMW Follow up and Convective Stand-alone Statement. Otherwise GFE; GHG			
Observing Services	SCD - Supplementary Climatological Data	Text Editor			
Public and Fire Weather Services	SPS - Special Weather Statement	Areal SPS – GFE; GHG	Convective SPS - WarnGen		
Public and Fire Weather Services	CCF - Coded Cities Forecast	GFE	Text Workstation Editor		
Public and Fire Weather Services	FWF - Fire Weather Planning Forecast	GFE	Text Workstation Editor		

Weather Forecast Office (WFO) Generated Products, 12/27/2007	Product Identifier	Primary App	Alternative App	Site Customized? (Y/N)	Site Tested? (Y/N)
Public and Fire Weather Services	FWS - Site Specific Forecasts (SPOT)	GFE	Text Workstation Editor		
Public and Fire Weather Services	NOW - Short Term Forecast	GFE	Convective NOW may be issued with WarnGen, Text Workstation Editor		
Public and Fire Weather Services	PFM - Point Forecast Matrices	GFE	Text Workstation Editor		
Public and Fire Weather Services	SFT - Tabular State Forecast Product	GFE			
Public and Fire Weather Services	Gridded Dew Point Temperature	GFE			
Public and Fire Weather Services	Gridded Wind Gust	GFE			
Public and Fire Weather Services	Gridded Apparent Temperature	GFE			
Public and Fire Weather Services	AFM - Area Forecast Matrices	GFE	Text Workstation		
Public and Fire Weather Services	SFP - State Forecast Product	GFE	Text Workstation Editor		
Public and Fire Weather Services	ZFP - Zone Forecast Product	GFE	Text Workstation Editor		
Public and Fire Weather Services	Gridded 12-hour Probability of Precipitation	GFE			
Public and Fire Weather Services	Gridded Maximum Temperature	GFE			
Public and Fire Weather Services	Gridded Minimum Temperature	GFE			
Public and Fire Weather Services	Gridded Relative Humidity	GFE			
Public and Fire Weather Services	Gridded Sky Cover	GFE			
Public and Fire Weather Services	Gridded Temperature	GFE			
Public and Fire Weather Services	Gridded Wind Speed and Direction	GFE			
Public and Fire Weather Services	Gridded Weather	GFE			

Weather Forecast Office (WFO) Generated Products, 12/27/2007	Product Identifier	Primary App	Alternative App	Site Customized? (Y/N)	Site Tested? (Y/N)
Public and Fire Weather Services	AQI - Air Quality Statement	GFE;	Text Workstation Editor		
Public and Fire Weather Services	AQA - Air Quality Alert Message	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	AVA - Avalanche Watch	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	AVW - Avalanche Warning	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	CAE - Child Abduction Emergency	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	CDW - Civil Danger Warning	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	CEM - Civil Emergency Message	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	EQW - Earthquake Warning	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	EVI - Evacuation Immediate	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	FRW - Fire Warning	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	HMW - Hazardous Materials Warning	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	LAE Local Area Emergency	GFE; GHG	Text Workstation Editor		

Weather Forecast Office (WFO) Generated Products, 12/27/2007	Product Identifier	Primary App	Alternative App	Site Customized? (Y/N)	Site Tested? (Y/N)
Public and Fire Weather Services	LEW - Law Enforcement Warning	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	NPW - Non Precipitation Watches/Warnings/and Advisories	GFE; GHG			
Public and Fire Weather Services	NUW - Nuclear Power Plant Warning	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	PNS - Public Information Statement	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	RFW - Fire Watch/Red Flag Warning	GFE; GHG			
Public and Fire Weather Services	RHW - Radiological Hazard Warning	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	SPW - Shelter in Place Warning	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	TOE 911 - Telephone Outage Emergency	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	VOW - Volcano Warning	GFE; GHG	Text Workstation Editor		
Public and Fire Weather Services	WCN - Watch County Notification Message	GFE; GHG			
Public and Fire Weather Services	WSW - Winter Weather Watches/Warnings/and Advisories	GFE; GHG			
Public and Fire Weather Services	Graphical Hazardous Weather Outlook *Experimental	GFE; GHG			
Public and Fire Weather Services	RTP - Max/Min Temperature and Precipitation Table	GFE; RiverPro	Text Workstation Editor		

Weather Forecast Office (WFO) Generated Products, 12/27/2007	Product Identifier	Primary App	Alternative App	Site Customized? (Y/N)	Site Tested? (Y/N)
Public and Fire Weather Services	HWR - Hourly Weather Roundup	Hourly Weather Roundup			
Public and Fire Weather Services	LSR - Local Storm Report	Local Storm Report	Text Workstation Editor		
Public and Fire Weather Services	FWA - Incident Meteorologist Status Report	Text Editor			
Public and Fire Weather Services	EQR - Earthquake Reports	Text Workstation Editor			
Public and Fire Weather Services	FWM - National Fire Danger Rating System Forecast	Text Workstation Editor			
Public and Fire Weather Services	FWN - National Fire Danger Rating System Forecast Receipt Verification	Text Workstation Editor			
Public and Fire Weather Services	FWO - National Fire Danger Rating System Fire Weather Observations	Text Workstation Editor			
Public and Fire Weather Services	HWO - Hazardous Weather Outlook	Text Workstation Editor			
Public and Fire Weather Services	REC - Recreation Report	Text Workstation Editor			
Public and Fire Weather Services	RFD - Rangeland Fire Danger	Text Workstation Editor			
Public and Fire Weather Services	RWS - Weather Summary	Text Workstation Editor			
Public and Fire Weather Services	SMF - Smoke Management Forecast	Text Workstation Editor			
Public and Fire Weather Services	ADR,ADM,and ADA Administrative Message	Text Workstation Editor			
Public and Fire Weather Services	AFD - Area Forecast Discussion	Text Workstation Editor,			
Public and Fire Weather Services	SVR - Severe Thunderstorm Warning	WarnGen			
Public and Fire Weather Services	SVS - Severe Weather Statement	WarnGen			
Public and Fire Weather Services	TOR - Tornado Warning	WarnGen			
Public and Fire Weather Services	RWR - Weather Roundup	Weather Roundup			
Public and Fire Weather Services	ASA - Air Stagnation				

Weather Forecast Office (WFO) Generated Products, 12/27/2007	Product Identifier	Primary App	Alternative App	Site Customized? (Y/N)	Site Tested? (Y/N)
Tropical Services	Graphical Hazards Suite *Experimental until 2009	GFE; GHG			
Tropical Services	HLS - Hurricane Local Statement	GFE; GHG			
Tropical Services	NPW - Inland Tropical Storm/Hurricane Watch or Warning	GFE; GHG			
Tropical Services	AGF - Precipitation Forecast for specific areas of Hawaii	Text Workstation Editor			
Tropical Services	PSH - Post-Tropical Cyclone Reports	Text Workstation Editor			
Tropical Services	SIM - Satellite Interpretation Message, Only issued from WFOs Guam and Honolulu	Text Workstation Editor			
Tropical Services	TCP - Tropical Cyclone Public Advisories - Only issued from WFO Guam	Text Workstation Editor			
Tropical Services	TCSCP - Dvorak fixes for the Central Pacific	Text Workstation Editor			
Tropical Services	TCSSP - Dvorak fixes for the Central Pacific	Text Workstation Editor			
Tropical Services	TWOCP - Tropical Weather Outlook for Central Pacific	Text Workstation Editor			
Tropical Services	EWW - Extreme Wind Warning	WarnGen			
River Forecast Center (RFC) Generated Products 12/27/2007	**Product Identifier**	**Primary Application**	**Alternative Application**	**Comments**	
Hydrologic Services	Significant River Flood Outlook Product	ArcView			
Hydrologic Services	FFD - Gridded Flash Flood Guidance	Flash Flood Guidance System (FFGS)	Other local applications		
Hydrologic Services	FFG - Areal Flash Flood Guidance	Flash Flood Guidance System (FFGS)	Other local applications		
Hydrologic Services	FFH - Headwater Flash Flood Guidance	Flash Flood Guidance System FFGS	Other local applications		
Hydrologic Services	ESG - Extended Range Streamflow Guidance	Local Application	Text Editor		

Weather Forecast Office (WFO) Generated Products, 12/27/2007	Product Identifier	Primary App	Alternative App	Site Customized? (Y/N)	Site Tested? (Y/N)
Hydrologic Services	ESP - Extended Range Streamflow Prediction Product	Local Application	Text Editor		
Hydrologic Services	FFV - Hydrologic Model Variable States and Parameters	Local Application	Text Editor		
Hydrologic Services	Hyx - Hydrometeorological Data Summary Products	Local Applications			
Hydrologic Services	RRx - Hydrometeorological Data Products	Local Applications			
Hydrologic Services	HCM - Hydrometeorological Coordination Message	Text Editor			
Hydrologic Services	HMD - Hydrometeorological Discussion	Text Editor			
Hydrologic Services	RVF- Short Term Hydrologic Forecast Product	X-SETS	Other local applications		
National Centers for Environmental Prediction (NCEP) Generated Products 12/27/2007	**Product Identifier**	**Primary Application**	**Alternative Application**		
Marine Services Ocean Prediction Center (OPC)	HSF - High Seas Forecast	Text Workstation Editor			
Marine Services Ocean Prediction Center (OPC)	MIM - Marine Weather Discussion	Text Workstation Editor			
Marine Services Ocean Prediction Center (OPC)	NAVTEX - Navigational Teleprinter Exchange	Text Workstation Editor			
Marine Services Ocean Prediction Center (OPC)	OFF - Offshore Forecast	Text Workstation Editor			
Tropical Services Tropical Prediction Center (TPC)	HSF - High Seas Forecast	Text Workstation Editor			
Tropical Services Tropical Prediction Center (TPC)	MIM - Marine Weather Discussion	Text Workstation Editor			
Tropical Services Tropical Prediction Center (TPC)	NAVTEX - Navigational Teleprinter Exchange	Text Workstation Editor			
Tropical Services Tropical Prediction Center (TPC)	OFF - Offshore Forecast	Text Workstation Editor			

Weather Forecast Office (WFO) Generated Products, 12/27/2007	Product Identifier	Primary App	Alternative App	Site Customized? (Y/N)	Site Tested? (Y/N)
Tropical Services Tropical Prediction Center (TPC)	STD - Satellite Rainfall Estimates	Text Workstation Editor			
Tropical Services Tropical Prediction Center (TPC)	TPT - Pan-American Temperature and Precipitation Table	Text Workstation Editor			
Tropical Services Tropical Prediction Center (TPC)	TWD - Tropical Weather Discussion	Text Workstation Editor			
Alaska Aviation Weather Unit (AAWU) Generated Products 12/27/2007	**Product Identifier**	**Primary Application**	**Alternative Application**		
Aviation Services	VAA - Volcanic Ash Advisory	Text Workstation Editor			
Aviation Services	FA - Area Forecasts	Text Workstation Editor			
Aviation Services	SIG - Significant Meteorological Advisories (SIGMET)	Text Workstation Editor			
Aviation Services	WA - Airmen'sMeteorological Advisories (AIRMET)	Text Workstation Editor			
Aviation Services	WST - Convective Significant Meteorological Advisories (SIGMET)	Text Workstation Editor			
Aviation Services	WSV - Nonconvective Significant Meteorological Advisories (SIGMET)	Text Workstation Editor			
Hydrologic Products Generated on National Systems	**Product Identifier**	**Primary Application**	**Alternative Application**		
Hydrologic Services	GPHWNH - National Significant River Flood Outlook	NCEP-AWIPS			
Hydrologic Services	RRS - Hydrometeorological Automated Data System Report	HADS custom software, relayed through AWIPS Telecom Gateway			
Hydrologic Services	RSD - Daily SNOTEL Report	Custom software, relayed through AWIPS Telecom Gateway			

Weather Forecast Office (WFO) Generated Products, 12/27/2007	Product Identifier	Primary App	Alternative App	Site Customized? (Y/N)	Site Tested? (Y/N)
Hydrologic Services	RSM - Monthly SNOTEL Report	Custom software, relayed through AWIPS Telecom Gateway			
Hydrologic Services	RRM - Airborne Survey Gamma Product	Developed on the NOHRSC Operational Product Processing System (OPPS), then disseminated by AWIPS			
Hydrologic Services	SCV - Satellite Areal Extent of Snow Cover Product	Developed on the NOHRSC Operational Product Processing System (OPPS), then disseminated by AWIPS			
Hydrologic Services	SWE - Estimated Snow Water Equivalent by Basin Product	Developed on the NOHRSC Operational Product Processing System (OPPS), then disseminated by AWIPS			
Hydrologic Services	94E, 98E, 99E - Probability of Rainfall Exceeding Flash Flood Guidance (Day 1-3)	NCEP-AWIPS			
Hydrologic Services	ERD - Excessive Rainfall Discussion	NCEP-AWIPS			
Hydrologic Services	6-Hour Quantitative Precipitation Forecasts (Day 1-3) (See Table 1 for AWIPS IDs)	NCEP-AWIPS			
Hydrologic Services	94Q, 98Q, 99Q - 24-Hour Quantitative Precipitation Forecast (Day 1-3)	NCEP-AWIPS			
Hydrologic Services	PFD - Quantitative Precipitation Forecast Discussion	NCEP-AWIPS			
Hydrologic Services	95E - 5-Day Quantitative Precipitation Forecast	NCEP-AWIPS			

Deployment and Transition Planning

Local Applications (LA) Migration

- LA migration has become simpler and more familiar over the last several months
  - Command Line Interface with choice of scripting language (TO10 delivery)
    - Python is recommended but not a hard requirement
  - TextDB and HandleOUP utilities will work in A2 as they do in A1
  - The A2 subscription service provides a simple command line interface to replace A1 “triggers”
  - “Smart Interface” allows Python Smart Tools to be migrated with minor change (TO 10 delivery)
  - “How to” documentation will be delivered with SW dev TO and TOT1 deliveries
- A standard AWIPS Workstation configuration will support testing of LA
  - CAVE + EDEX + CLI
  - Canned Data for testing
  - The new NAS provides opportunities for LA execution and testing
- NWS to determine relevant Site or Region Policies (e.g., isolation from WAN)

Data and Transition Planning

Local Applications (LA) Migration

- LA “Plug-ins” (e.g., CAVE, SOA, data) will be located in a specific directory similar to the Baseline plug-ins (i.e., likely to be a tree structure with a branch terminating with a “base” leaf and an adjacent “local” leaf).
  - Details will be developed in TO11. Change to Camel has caused changes to baseline locations.
- Recommend setting up a Unix standard execution structure on a shared mount from the NAS for LA scripts.
  - Partition would also hold output data and provide a means to contain “run away” apps from filling disk space outside the partition.
  - May suffice for LA Test Environment.

Data and Transition Planning

Initial Deployment Configuration

- Target configuration through initial deployment (aka “deployment config”)
- A1 and A2 to operate (individually) on the same hardware / OS base
- Have a set-up on WNCF for SBN-CP (LDM) feed
- Simultaneous SBN feed to A1 + A2 partitions on NAS
- A1 and A2 Postgres installation testing will be done in TO11
- Minimize HW/OS set-up to changeover (e.g., cutover /rollback) either way
  - Http CAVE Client to EDEX may enable same NAS configuration for A1 or A2
- A1-to-A2 process mapping and HW location is in linked spreadsheet on architecture diagrams

NEXT STEPS:

- Enable ORPG and LDAD data feeds for later testing (TO11): Copy from A1 partition to A2 partition; used canned LDAD test data in lab
- Further testing will occur in TO11 and refinements may be made

OB9 CONUS WFO Architecture
AWIPS II Components Deployment Concept

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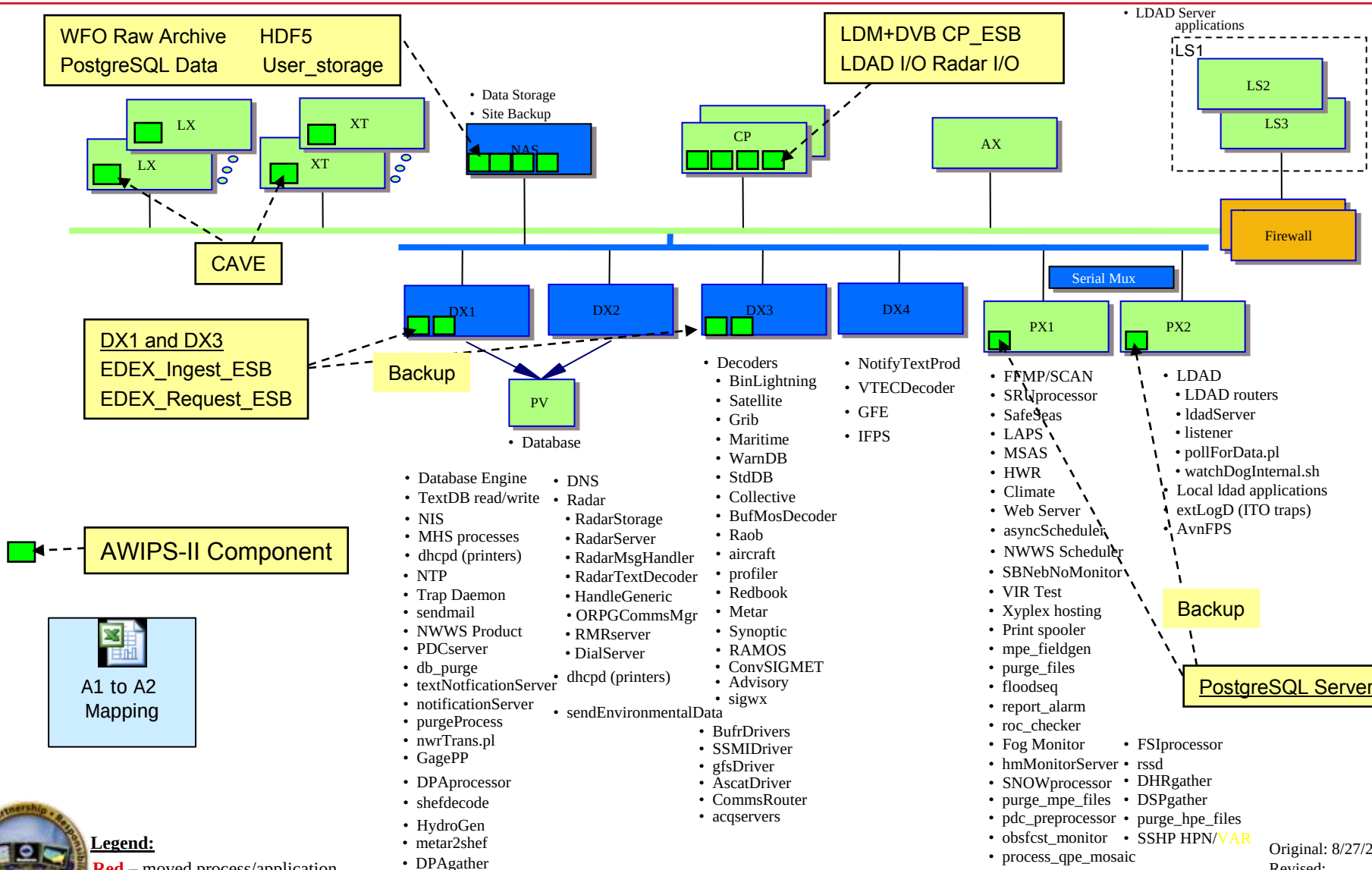
Deployment Configuration



Legend:
Red – moved process/application
Yellow – new process/application

Original: 8/27/2008
Revised:

A1 to A2 Migration: WFO CONUS

AWIPS I		AWIPS II	
Location	**Process**	**Process**	**Location**
DX1	Database Engine	PostgreSQL	PX
	TextDB Read/Write	EDEX_ESB	DX cluster
	NIS		
	MHS processes		DX cluster
	dhcpd (printers)		
	NTP		
	Trap Daemon		
	sendmail		
	NWWS Product		
	PDCserver		
	db_purge		
	textNotificationServer	EDEX_ESB	DX cluster
	notificationServer	EDEX_ESB	DX cluster
	purgeProcess		
	nwrTrans.pl		
	GagePP		
	DPAprocessor	EDEX_ESB	DX cluster
	shefdecode	EDEX_ESB-shef	DX cluster
	HydroGen		
	metar2shef	EDEX_ESB-metar transformer	DX cluster
	DPAgather		
DX2	DNS		
	RadarStorage	RadarServer	CP cluster
	RadarServer	RadarServer	CP cluster
	RadarMsgHandler	RadarServer	CP cluster
	RadarTextDecoder	RadarServer	CP cluster
	HandleGeneric	RadarServer	CP cluster
	ORPGCommsMgr	RadarServer	CP cluster
	rmRserver	N/A	
	DialServer	RadarServer	CP cluster
	dhcpd (printers)		
	sendEnvironmentalData		
DX3	BinLightning Decoder	EDEX_ESB-binlightning	DX cluster
	Satellite Decoder	EDEX_ESB-satellite	DX cluster
	Grib Decoder	EDEX_ESB-grib	DX cluster
	Maritime Decoder	EDEX_ESB-sfcobs	DX cluster
	WarnDB Decoder	EDEX_ESB-warning	DX cluster
	StdDB Decoder	EDEX_ESB-text	DX cluster
	Collective Decoder	EDEX_ESB-text	DX cluster
	BufMosDecoder	EDEX_ESB-bufrmos	DX cluster
	Raob Decoder	EDEX_ESB-bufrua	DX cluster
	aircraft Decoder	EDEX_ESB-airep, pirep	DX cluster
	profiler Decoder	EDEX_ESB-goessounding	DX cluster
	Redbook Decoder	EDEX_ESB-redbook	DX cluster
	Metar Decoder	EDEX_ESB-obs	DX cluster
	Synoptic Decoder	EDEX_ESB-sfcobs	DX cluster
	RAMOS Decoder	?	
	ConvSIGMET Decoder	?	
	Advisory Decoder	?	
	sigwx Decoder	? Bufr decoder + Rendering	
	BufrDrivers	N/A	

A1 to A2 Migration: WFO CONUS

AWIPS I		AWIPS II	
	SSMIDriver	N/A	
	gfsDriver	N/A	
	AscatDriver	N/A	
	CommsRouter	N/A	
	acqservers	LDM client	CP cluster
DX4	NotifyTextProd	EDEX_ESB	DX cluster
	VTECDecoder	EDEX_ESB-warning	DX cluster
	GFE	EDEX_ESB-gfe	DX cluster
	IFPS	EDEX_ESB-gfe	DX cluster
PX1	FFMP/SCAN	CAVE-SCAN, FFMP plug ins	LX
	SRUprocessor	EDEX_ESB	DX cluster
	SafeSeas	CAVE-SafeSeas plug in	LX
	LAPS		
	MSAS	?	
	HWR	?	
	Climate	EDEX_ESB - quartz triggered	DX cluster
	Web Server		
	asyncScheduler		
	NWWS Scheduler	EDEX_ESB - quartz triggered	DX cluster
	SBNebNoMonitior	?	
	VIR Text		
	Xyplex hosting		
	Print spooler		
	mpe_fieldgen	EDEX_ESB - quartz triggered	DX cluster
	purge_files		
	floodseq		
	report_alarm	EDEX_ESB - quartz triggered	DX cluster
	roc_checker	EDEX_ESB - quartz triggered	DX cluster
	FogMonitor		
	hmMonitorServer		
	SNOWprocessor		
	purge_mpe_files		
	pdc_preprocessor		
	obsfcst_monitor	N/A NWSRFS related	
	process_qpe_mosaic	EDEX_ESB - quartz triggered	DX cluster
	FSIprocessor		
	rssd		
	DHRgather		
	DSPgather		
	purge_hpe_files		
	SSHP HPN		
PX2	LDAD routers	ldadServer	CP Cluster
	ldadServer	ldadServer	CP Cluster
	listener	ldadServer	CP Cluster
	pollForData.pl	ldadServer	CP Cluster
	watchDogInternal.sh	ldadServer	CP Cluster
	Local ldad applications	?	
	extLogD (ITO traps)	?	
	AvnFPS	CAVE-aviation	LX

OB9 OCONUS WFO Architecture
AWIPS II Components Deployment Concept

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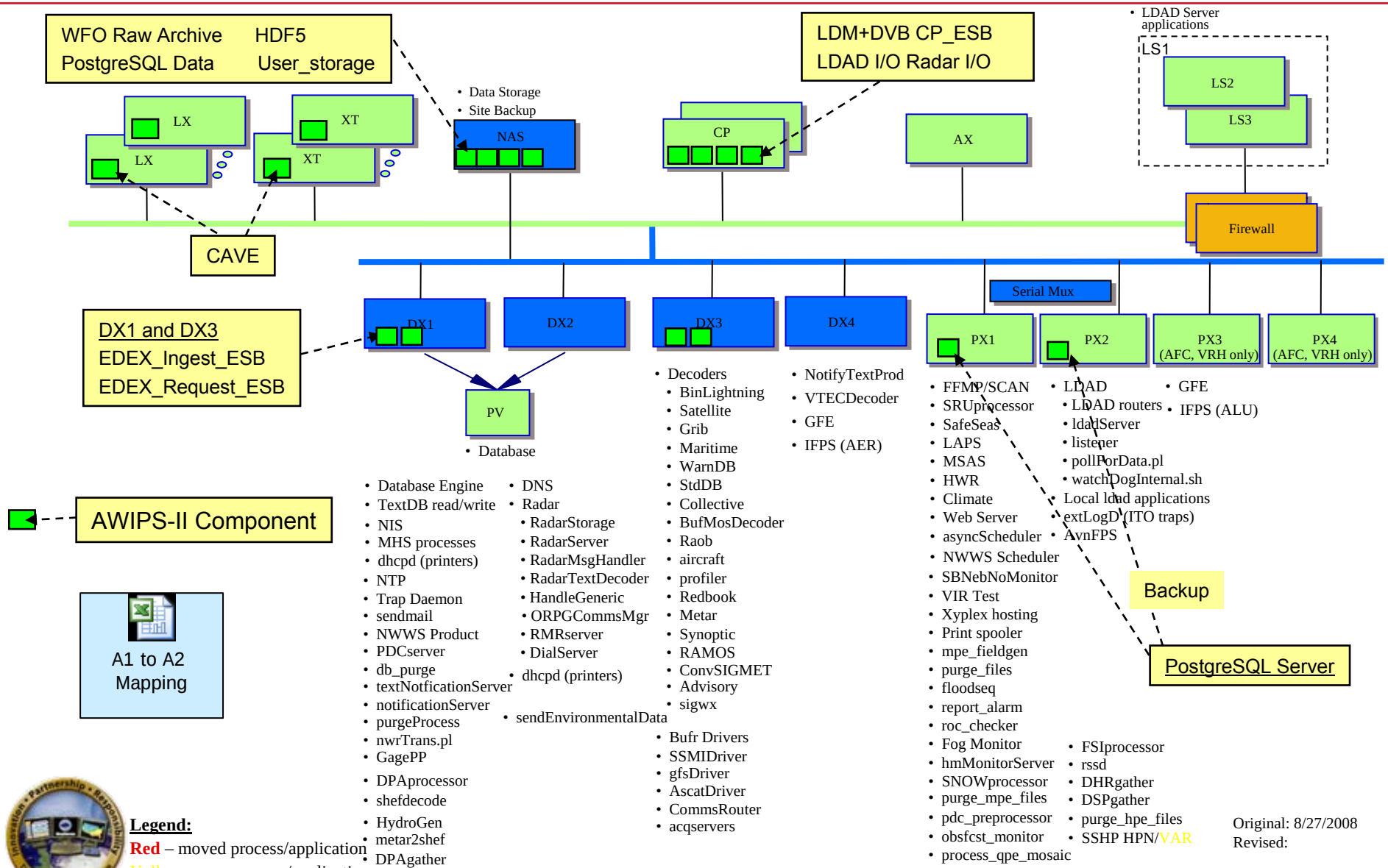
Deployment Configuration



Legend:
Red – moved process/application
Yellow – new process/application

Original: 8/27/2008
Revised:

A1 to A2 Migration: WFO OCONUS

AWIPS I		AWIPS II	
Location	**Process**	**Process**	**Location**
DX1	Database Engine	PostgreSQL	PX
	TextDB Read/Write	EDEX_ESB	DX cluster
	NIS		
	MHS processes		DX cluster
	dhcpd (printers)		
	NTP		
	Trap Daemon		
	sendmail		
	NWWS Product		
	PDCserver		
	db_purge		
	textNotificationServer	EDEX_ESB	DX cluster
	notificationServer	EDEX_ESB	DX cluster
	purgeProcess		
	nwrTrans.pl		
	GagePP		
	DPAprocessor	EDEX_ESB	DX cluster
	shefdecode	EDEX_ESB-shef	DX cluster
	HydroGen		
	metar2shef	EDEX_ESB-metar transformer	DX cluster
	DPAgather		
DX2	DNS		
	RadarStorage	RadarServer	CP cluster
	RadarServer	RadarServer	CP cluster
	RadarMsgHandler	RadarServer	CP cluster
	RadarTextDecoder	RadarServer	CP cluster
	HandleGeneric	RadarServer	CP cluster
	ORPGCommsMgr	RadarServer	CP cluster
	rmRserver	N/A	
	DialServer	RadarServer	CP cluster
	dhcpd (printers)		
	sendEnvironmentalData		
DX3	BinLightning Decoder	EDEX_ESB-binlightning	DX cluster
	Satellite Decoder	EDEX_ESB-satellite	DX cluster
	Grib Decoder	EDEX_ESB-grib	DX cluster
	Maritime Decoder	EDEX_ESB-sfcobs	DX cluster
	WarnDB Decoder	EDEX_ESB-warning	DX cluster
	StdDB Decoder	EDEX_ESB-text	DX cluster
	Collective Decoder	EDEX_ESB-text	DX cluster
	BufMosDecoder	EDEX_ESB-bufrmos	DX cluster
	Raob Decoder	EDEX_ESB-bufrua	DX cluster
	aircraft Decoder	EDEX_ESB-airep, pirep	DX cluster
	profiler Decoder	EDEX_ESB-goessounding	DX cluster
	Redbook Decoder	EDEX_ESB-redbook	DX cluster
	Metar Decoder	EDEX_ESB-obs	DX cluster
	Synoptic Decoder	EDEX_ESB-sfcobs	DX cluster
	RAMOS Decoder	?	
	ConvSIGMET Decoder	?	
	Advisory Decoder	?	
	sigwx Decoder	? Bufr decoder + Rendering	

A1 to A2 Migration: WFO OCONUS

AWIPS I		AWIPS II	
	BufrDrivers	N/A	
	SSMIDriver	N/A	
	gfsDriver	N/A	
	AscatDriver	N/A	
	CommsRouter	N/A	
	acqservers	LDM client	CP cluster
DX4	NotifyTextProd	EDEX_ESB	DX cluster
	VTECDecoder	EDEX_ESB-warning	DX cluster
	GFE	EDEX_ESB-gfe	DX cluster
	IFPS	EDEX_ESB-gfe	DX cluster
PX1	FFMP/SCAN	CAVE-SCAN, FFMP plug ins	LX
	SRUprocessor	EDEX_ESB	DX cluster
	SafeSeas	CAVE-SafeSeas plug in	LX
	LAPS		
	MSAS	?	
	HWR	?	
	Climate	EDEX_ESB - quartz triggered	DX cluster
	Web Server		
	asyncScheduler		
	NWWS Scheduler	EDEX_ESB - quartz triggered	DX cluster
	SBNebNoMonitior	?	
	VIR Text		
	Xyplex hosting		
	Print spooler		
	mpe_fieldgen	EDEX_ESB - quartz triggered	DX cluster
	purge_files		
	floodseq		
	report_alarm	EDEX_ESB - quartz triggered	DX cluster
	roc_checker	EDEX_ESB - quartz triggered	DX cluster
	FogMonitor		
	hmMonitorServer		
	SNOWprocessor		
	purge_mpe_files		
	pdc_preprocessor		
	obsfcst_monitor	N/A NWSRFS related	
	process_qpe_mosaic	EDEX_ESB - quartz triggered	DX cluster
	FSIprocessor		
	rssd		
	DHRgather		
	DSPgather		
	purge_hpe_files		
	SSHP HPN		
PX2	LDAD routers	ldadServer	CP Cluster
	ldadServer	ldadServer	CP Cluster
	listener	ldadServer	CP Cluster
	pollForData.pl	ldadServer	CP Cluster
	watchDogInternal.sh	ldadServer	CP Cluster
	Local ldad applications	?	
	extLogD (ITO traps)	?	
	AvnFPS	CAVE-aviation	LX

OB9 RFC Architecture
AWIPS II Components Deployment Concept

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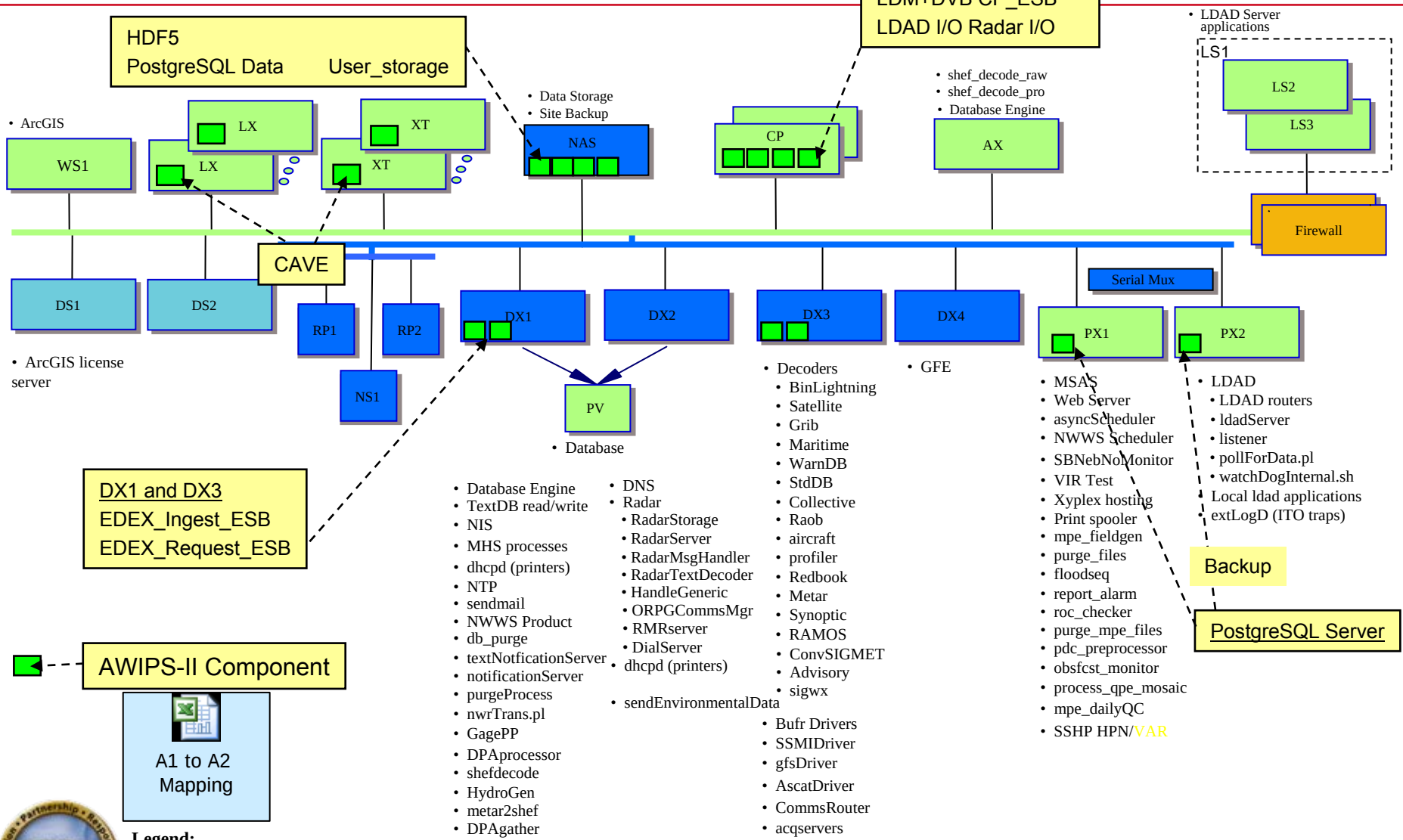
Deployment Configuration



Legend:
Red - moved process/application
Yellow - new process/application

Original: 8/27/2008
Revised:

A1 to A2 Migration: RFC

AWIPS I		AWIPS II	
Location	**Process**	**Process**	**Location**
DX1	Database Engine	PostgreSQL	PX
	TextDB Read/Write	EDEX_ESB	DX cluster
	NIS		
	MHS processes		DX cluster
	dhcpd (printers)		
	NTP		
	Trap Daemon		
	sendmail		
	NWWS Product		
	PDCserver		
	db_purge		
	textNotificationServer	EDEX_ESB	DX cluster
	notificationServer	EDEX_ESB	DX cluster
	purgeProcess		
	nwrTrans.pl		
	GagePP		
	DPAprocessor	EDEX_ESB	DX cluster
	shefdecode	EDEX_ESB-shef	DX cluster
	HydroGen		
	metar2shef	EDEX_ESB-metar transformer	DX cluster
	DPAgather		
DX2	DNS		
	RadarStorage	RadarServer	CP cluster
	RadarServer	RadarServer	CP cluster
	RadarMsgHandler	RadarServer	CP cluster
	RadarTextDecoder	RadarServer	CP cluster
	HandleGeneric	RadarServer	CP cluster
	ORPGCommsMgr	RadarServer	CP cluster
	rmRserver	N/A	
	DialServer	RadarServer	CP cluster
	dhcpd (printers)		
	sendEnvironmentalData		
DX3	BinLightning Decoder	EDEX_ESB-binlightning	DX cluster
	Satellite Decoder	EDEX_ESB-satellite	DX cluster
	Grib Decoder	EDEX_ESB-grib	DX cluster
	Maritime Decoder	EDEX_ESB-sfcobs	DX cluster
	WarnDB Decoder	EDEX_ESB-warning	DX cluster
	StdDB Decoder	EDEX_ESB-text	DX cluster
	Collective Decoder	EDEX_ESB-text	DX cluster
	BufMosDecoder	EDEX_ESB-bufrmos	DX cluster
	Raob Decoder	EDEX_ESB-bufrua	DX cluster
	aircraft Decoder	EDEX_ESB-airep, pirep	DX cluster
	profiler Decoder	EDEX_ESB-goessounding	DX cluster
	Redbook Decoder	EDEX_ESB-redbook	DX cluster
	Metar Decoder	EDEX_ESB-obs	DX cluster
	Synoptic Decoder	EDEX_ESB-sfcobs	DX cluster
	RAMOS Decoder	?	
	ConvSIGMET Decoder	?	
	Advisory Decoder	?	
	sigwx Decoder	? Bufr decoder + Rendering	
	BufrDrivers	N/A	
	SSMIDriver	N/A	

A1 to A2 Migration: RFC

AWIPS I		AWIPS II	
	gfsDriver	N/A	
	AscatDriver	N/A	
	CommsRouter	N/A	
	acqservers	LDM client	CP cluster
DX4	NotifyTextProd	EDEX_ESB	DX cluster
	VTECDecoder	EDEX_ESB-warning	DX cluster
	GFE	EDEX_ESB-gfe	DX cluster
	IFPS	EDEX_ESB-gfe	DX cluster
PX1	FFMP/SCAN	CAVE-SCAN, FFMP plug ins	LX
	SRUprocessor	EDEX_ESB	DX cluster
	SafeSeas	CAVE-SafeSeas plug in	LX
	LAPS		
	MSAS	?	
	HWR	?	
	Climate	EDEX_ESB - quartz triggered	DX cluster
	Web Server		
	asyncScheduler		
	NWWS Scheduler	EDEX_ESB - quartz triggered	DX cluster
	SBNebNoMonitior	?	
	VIR Text		
	Xyplex hosting		
	Print spooler		
	mpe_fieldgen	EDEX_ESB - quartz triggered	DX cluster
	purge_files		
	floodseq		
	report_alarm	EDEX_ESB - quartz triggered	DX cluster
	roc_checker	EDEX_ESB - quartz triggered	DX cluster
	FogMonitor		
	hmMonitorServer		
	SNOWprocessor		
	purge_mpe_files		
	pdc_preprocessor		
	obsfcst_monitor	N/A NWSRFS related	
	process_qpe_mosaic	EDEX_ESB - quartz triggered	DX cluster
	FSIprocessor		
	rssd		
	DHRgather		
	DSPgather		
	purge_hpe_files		
	SSHP HPN		
PX2	LDAD routers	ldadServer	CP Cluster
	ldadServer	ldadServer	CP Cluster
	listener	ldadServer	CP Cluster
	pollForData.pl	ldadServer	CP Cluster
	watchDogInternal.sh	ldadServer	CP Cluster
	Local ldad applications	?	
	extLogD (ITO traps)	?	
	AvnFPS	CAVE-aviation	LX

Data and Transition Planning

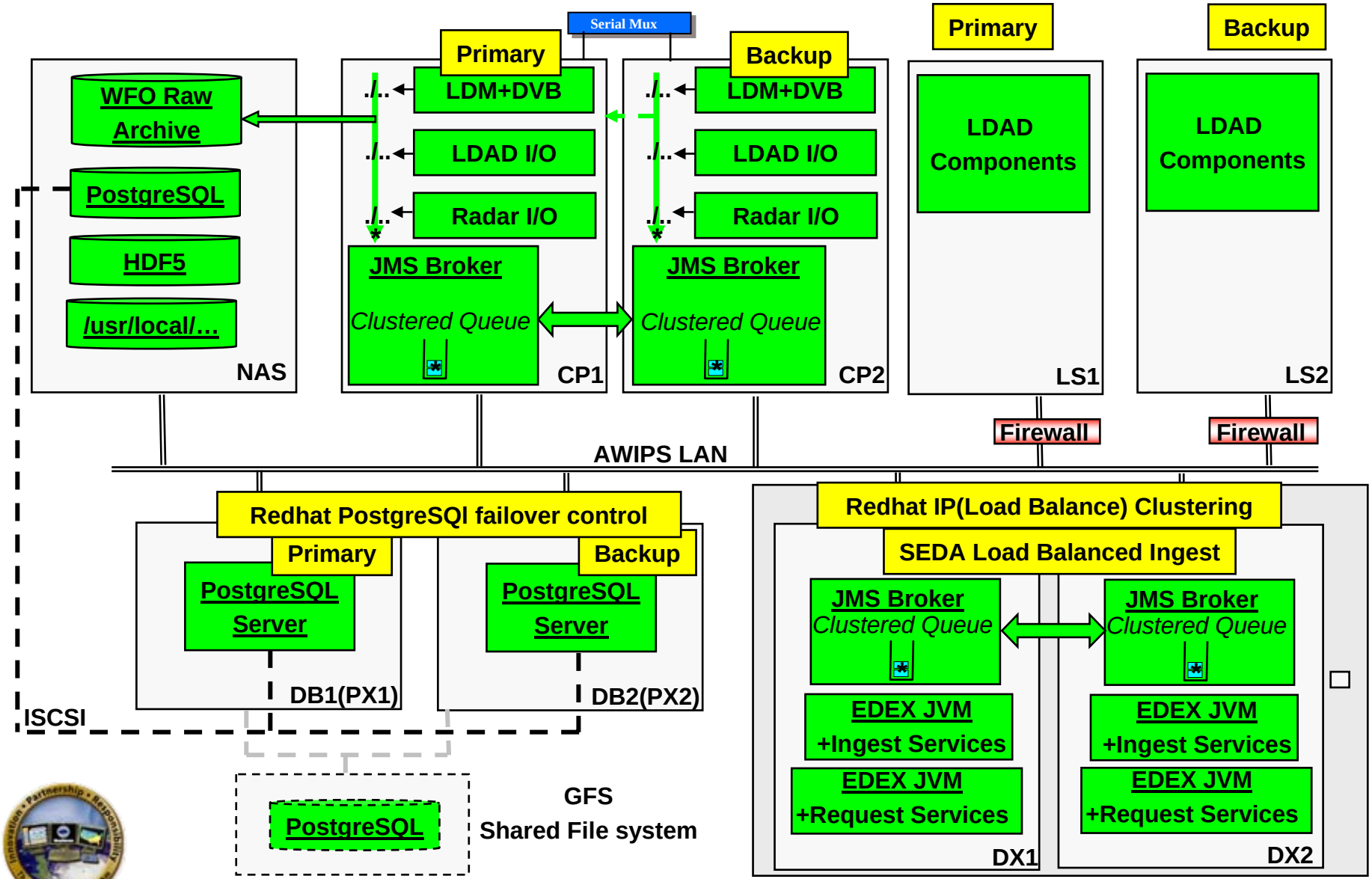
Long-Term Target Configuration

- Post initial deployment
- Anticipate reduced hardware requirements
- Anticipate project to re-cable and reduce Rack HW after A2 initial deployment

Deployment and Transition Planning

Raytheon

Long-Term Configuration



Deployment and Transition Planning

Operations Cutover / Rollback Approach

- This is only for moving A2 to Operations ***not site prep*** activities
  - Rollback is only for critical A2 issues after Operations Cutover
  - Site prep should NOT be done on system where rollback may be needed (e.g., an operational system).
- The simplest, "least risk" approach for cutover is the service backup model
  - Mitigates need for immediate rollback if problem encountered
  - Eliminates need for "synchronizing" data between A1/A2 at cutover and rollback
- Plan for cutover is "orderly shut-down/start-up" ala service backup model
  - Data needed to be ingested before cutover to operations:
    - Most recent Model Data (at least NAM & GFS)
    - Most recent Model Output Statistic products (MOS) from NAM and GFS
    - Last couple hours of surface observations
    - GFE Grids
    - Don't seem to be any absolute needs; apparent ways to get the data after the fact (A1)
    - Exact definition of data required at cutover needs to be worked during TO11
  - Test cutover and rollback further in TO11
- TO11 testing of cutover and roll back on TBW3 / TBW4
- TO11 testing of extent and duration of testing needed at cutover

Deployment and Transition Planning

Intersite Coordination (ISC) – (A2/A1 Interoperability During Deployment)

- A2 GFE will read / write netCDF for ISC
- No modifications will be made to A1 for ISC
- netCDF support is during deployment – not long term
  - netCDF moving to HDF5 version 4 is last supported version
- A2 ←(netCDF grids)→ A1 testing in TO11
- A2 GFE grids sent to NDFD in netCDF through initial deployment
- A2 (netCDF)→NDFD tested in TO11
  - netCDF may remain the data exchange format with NDFD
  - Avoids change on NDFD side
  - Follow A1 approach for ISC, Service Backup, WAN/MHS Testing

Deployment and Transition Planning

Service Backup

- No modifications made to A1 to accommodate Service Backup
- Scenarios to support
  - A1 site backs up A1 site (initial cutover)
    - A1 data shared; current normal
  - A2 site backs up A1 site (initial cutover or operational)
    - A1 data must be converted to A2 formats
  - A1 site backs up A2 site (rollback or operational)
    - **Must A2 data be converted to A1 formats?**
      (No, A1 uses the sites previous A1data (e.g., templates, text formats))
  - A2 site backs up A2 site (rollback or operational)
    - A2 data shared; future normal
- Product generation / dissemination to support
  - WarnGen
  - GFE / GHG
  - River Pro
  - AvnFPS

Deployment and Transition Planning

Service Backup

- WarnGen
  - Data
    - (Localized) Maps and Templates
    - Event Tracking Numbers (ETN) and AT
  - A2 will read/write A1 ETN / AT data; update as current
  - For A2 site to back up A1 site, Template and Map data **must be migrated beforehand**
- GFE / GHG
  - Data
    - Grids, Formatter (scripts), ETN / AT
    - IFPServer config file for backed-up site
    - Site-specific Smart Tools (et al.)
  - A2 will read/write netCDF for GFE use; so A2 backs up A1 by current processes for grids (central server)
  - A2 will read/write A1 ETN / AT data; update as current
  - A2 will read A1 IFPServer config (.py) file
  - A1 Formatter Scripts need to be converted to A2 beforehand
  - A1 Smart Tools (et al.) need to be converted beforehand

Deployment and Transition Planning

Service Backup

- River Pro
  - Data
    - Templates
    - Station Data
    - ETN / VTEC
  - Due to the way River Pro is being wrapped, current Template, databases, ETN/VTEC schemes will not require changes
- AvnFPS
  - Data
    - Current Observations (Metars)
    - TAF
    - Guidance (optional)
  - METAR and TAF data obtained automatically through the alert notification mechanism in EDEX
    - A1 and A2 ingest the data to format needed by specific AvnFPS
  - A2 site backing up an A1 site needs to have A1 config
    - A1 sites would need to config their A2 AvnFPS beforehand, then share with the A2 backup site

Deployment and Transition Planning

Service Backup

- All Service Backup scenarios to be detailed, tested, and refined in TO1
- Issues in continual updating of formatters and templates can complicate deployment. This can be mitigated by:
  - Sequencing installation so that Backup pairs cutover occur close together in time
  - Updating Site-specific data be limited in the interim between pairs
  - Details TBD jointly during TO11

MHS / Enterprise Service Bus (ESB) Transition

- MHS system and ESB don't interfere with one another (i.e., can co-exist)
- Plan is to leave MHS largely intact
- We intend to use the existing MHS with new interfaces that allow Java Plug-Ins and ESB endpoints to send and receive messages. The AWIPS-1 "C" APIs will be reused as much as possible.
- Complete implementation and test with TO11
- Follow A1 approach for ISC, Service Backup, WAN/MHS Testing

Deployment and Transition Planning

Technical Mechanics of Deployment

- "Deployment" for SW means delivery of the SW to the Sites
- SW Delivery to site will be as today, via physical medium → lowest risk
  - Includes a lot of support information
- "DR Fix" releases during OTE and Deployment will be via FTP
  - FTP SW executables only; minimal release notes

Deployment and Transition Planning

Technical Mechanics of Deployment

- Basic installation approach at an OTE or operational WFO site:
  - Complete Site Migration Activities.
  - Load A2 on A1 system.
  - Enter Service Backup.
  - Shut down A1 and start A2 (A1 remains on HW.
  - Perform Startup testing (includes local apps).
  - If okay, go out of Service Backup and into operational mode.
  - If issues arise that cannot be resolved, stay in service backup mode.
    - If fix is going to be "lengthy" (major issue – several days to resolve – not really expected at this time), roll back to A1 (last resort) and go out of Service Backup.
    - When fix is applied and tested *return* to Service Backup, re-start A2 and resume testing.
  - When satisfied with A2 Operation, remove A1.

Notes:

- Assumed that A2 has been tested during site prep and this will reduce time required for start-up testing.
- RFC has no Service Backup equivalent; detailed procedures need to be defined, tested, and documented during TO11. Network backup is automatic.
- Wrapping approach probably simplifies rollback.

Deployment and Transition Planning

Technical Mechanics of Deployment

- Scheduling (Sequencing)
  - Factors affecting scheduling include:
    - No disruption to operations
    - Weather
    - Support capacity
    - Site readiness
    - Complexity of system.
  - Some are planning on “just in time” site migration. If they aren’t scheduled early in cycle, then they have more time to get things done ***and*** more time to delay getting started. The thought being to apply lessons learned to later installations.
    - Deployment cannot occur as a “big bang.” Somebody has to be first; lessons learned can be applied to later cutovers; much of this will be worked out during OTE.
  - However, due to Service Backup, sites need to convert several items prior to being backed up by a Site already converted to A2. (See slides 21and 22.)
  - If Service Backup material is converted early, then it may not a factor in sequencing of site cutovers.
  - Actual sequencing and scheduling of deployment is TBD pending further testing and analysis.

Deployment and Transition Planning

Training Support

- DTP issue is support information needed for System Admin and App Focal Point Training
- Two current courses provide the framework and topics needed:
  - "AWIPS Operations Support" (course number M-21-02) - AFPs
  - "AWIPS System Manager (course number M-18-02) – ITO/ESA
- Raytheon's analysis of topic needs attached, "Sys Admin Training Analysis"
  - Raytheon to provide A2 specifics and "how to" guides for Topics where applicable
  - General info is available on websites of OS projects (e.g., Camel)
- Some information is currently available to structure and draft course content
  - TO11 Proposal will specify what information will be available when
  - Continue to work details with NWSTD
  - Need to get existing course material from NWSTD
- Train-the-Trainer session(s) for Application Focal Points requested
  - Adder to existing TOT1, include in TO11 proposal
- NWSTD has plans for course development and delivery that is matched to the state of the deployment (e.g., OTE)
- TOT1 for TO10 provides Local Application CLI, TextDB, HandleOUP info, and ADE programmer briefing updates
  - Some HandleOUP is scheduled for TO11 (comm portion) so details become available then


SysAdmin Training Analysis

System Administrator Training Analysis

	AWIPS Operations Support		AWIPS Systems Manager		
	Course Number: M-21-02		Course Number: M-18-02		
	Length: 48 hours (6 working days)		Length: 84 hours (12 working days)		
				Change?	Comments
	Objectives: This course is intended to provide a working knowledge of AWIPS architecture, software and troubleshooting techniques in support of the site System Administrator.		Objectives: The AWIPS System Manager's course is intended to provide the site personnel responsible for performing system administration (National Center and Headquarter support personnel) with an understanding of AWIPS hardware, communications, software components and dataflow. The emphasis will be on learning monitoring and problem-solving techniques.		The vast majority of non-SW components of the system will not change very much if at all. Sufficient inforamtion exists to: - Assess change to current course - Change structure of course as needed - Draft the vast majority of SW content without TO11 information Sufficient time exists between A2R1 and OTE to complete the SW related content IF the work from known info is completed prior
Ref		Ref			
1	Roles & Responsibilities (1 hr)	1	Roles & Responsibilities (1.5 hours)	N	
2	Change Management (1 hr)	2	Change Management (2.0 hours)	N	
			Module 2: Monitoring Tools	Y	Less info than 19
3	System Architecture Review (1 hr)	3	System Architecture Review (1.5 hours)	Y	Info available to draft section
4	Networking Overview (3 hrs)	4	Networking (4.0 hours)	N	
5	Xyplex Use (2.0 hrs)	5	Xyplex (2.5 hours)	N	
6	Front-End Processing (2.0 hrs)	6	Front-End Processing (2.5 hours)	Y	~80% info available to draft section
7	Ingest Programs & Data Flow (6.5 hrs)	7	Ingest Programs & Data Flow (6.5 hours)	Y	~80% info available to draft section
8	SBN Retransmission (.5 hr)	8	SBN Retransmit (.5 hours)	Y	Info available with TO11; not a large amount of info needed
9	Message Handling System (2.5 hrs)	9	Message Handling System (3.0 hours)	Y	Very minor changes to exisitng system
10	Crons (1 hr)	10	Crons (2.5 hours)	Y	Need "how to" on modifying the ESB configruation files to maintain cron style entries. In addition, some tasks may be managed by EDEX subscriptions - material to be with TOT1 for TO10
11	Postgres D.B. Functions (5.5 hrs)	11	Postgres Database (7.0 hours)	Y	80% info available with TO10 for draft. TextDB changing
12	(empty)	12	Firewall (5.5 hours)	N	
13	AWIPS Security Issues (2.0 hrs)	13	Security (4.0 hours)	Y	minor change to scheme
14	LDAD (2.0 hrs)	14	LDAD (6.5 hours)	N	very minor change to PX; none to LS
15	System Backup & Recovery (3.5 hrs)	15	System Backup & Recovery (4.0 hours)	Y	TO11
16	MC Service Guard Overview (2.5 hrs)	16	MC Service Guard & Linux Clusters (4.5 hours)	Y	?
17	System Boot Procedures (2.5 hrs)	17	System Shutdown & Booting (5.0 hours)	Y	90% of infor available now to draft

System Administrator Training Analysis

	AWIPS Operations Support		AWIPS Systems Manager		
18	Localization and Customization (13 hrs)	18	(empty)	Y	60% of localization info available now for localization 90% of customization info available now - minor changes
19	Admin Tips and System Monitoring (3.0 hrs)	19	Administration Tips, System Checkup, Monitoring (4.0 hours)	Y	80% of info available now to draft; System operation will be simplified; Need info on Deployment config - comes after TO11
		20	Troubleshooting (10.5 hours)	Y	Minor change to HW and Networking; 80% of software info available for draft;
		21	Localization Backup & Recovery (2.0 hours)	Y	"Localization Backup"? Backup & Recovery with TO11

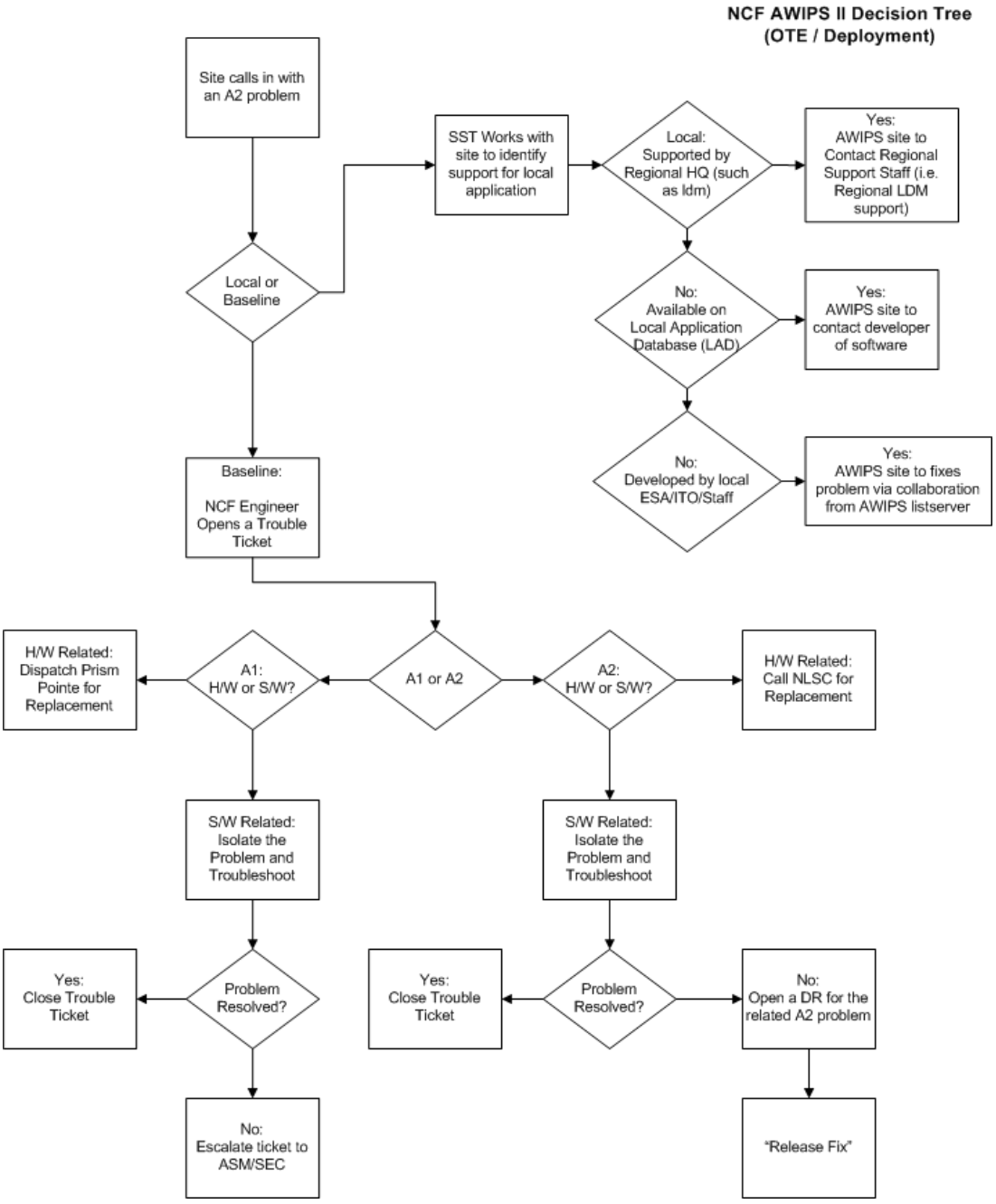
Deployment and Transition Planning

Raytheon OT&E Support

- Supported Site Configuration will be the “Deployment Configuration” defined in Site Migration section
  - Detailed configuration specification to be delivered during TO11
- Install / cutover / rollback during OTE same as previously discussed
  - Detailed testing to occur during TO11
- NCF and Raytheon Omaha technical support to NWS staff
  - Weekly 1-hour telephone conferences to “tag up”
  - NCF support as discussed on slide 36 (e.g., tiger team)
- Trouble Ticket processing
  - NCF Processing flow to be modeled after the LDAD OTE flow (see “TT Flow example”)
  - Finalize prior to OTE entry
- Distribution of SW fixes to be bi-weekly or weekly releases to start
  - Frequency based on need and logistics
  - SW fix distributions during OTE via FTP


TT Flow Example

Trouble Ticket Flow Example



Deployment and Transition Planning

Post "TO11" Support Task Order Descriptions

- Support that is needed up to time of OTE entry will be in TO11
  - Activities, deliverables, and costs will be identifiable in the proposal
- Areas to be in TO11 include
  - "Post TO11 / Pre-OTE" DR fix support
  - O&M Transition Support: OMA support to SMS, MA (to OTE)
  - Additional DTP will probably not be needed, but any DTP tasks would be part of TO11
- **OTE Support**
  - POP: OTE entry to Start of Deployment – 6 months assumed
  - Periodic TIMs (possibly weekly teleconferences to start)
  - Issue Resolution (TT) – SW / HW
  - TT processing overhead
  - SW fixes, releases
  - Documentation updates
  - Omaha support to SMS, NCF O&M transition
  - NCF support as discussed on slide 36 (e.g., tiger team)

Deployment and Transition Planning

Post "TO11" Support Task Order Descriptions

- **Deployment Support:**
  - POP: After OTE through 6 months
  - Issue Resolution – SW / environment configuration
  - SMS in primary contact mode per transition plan slide #
  - TT processing overhead
  - SW fixes, releases
  - NCF support separate (O&M funded)
  - Omaha support is to SMS, NCF (still TO funded)
- **Additional Training Support**
  - Up to OTE, During OTE, After OTE
  - Will be included and identifiable in other Support Task Orders
- AWIPS Extended Work will be different proposals

Next Steps:

- ***Jointly*** identify support tasks needed
- Need to ***jointly*** work through some details on TTR/DR processing for Pre-OTE and OTE

Deployment and Transition Planning

O&M Transition

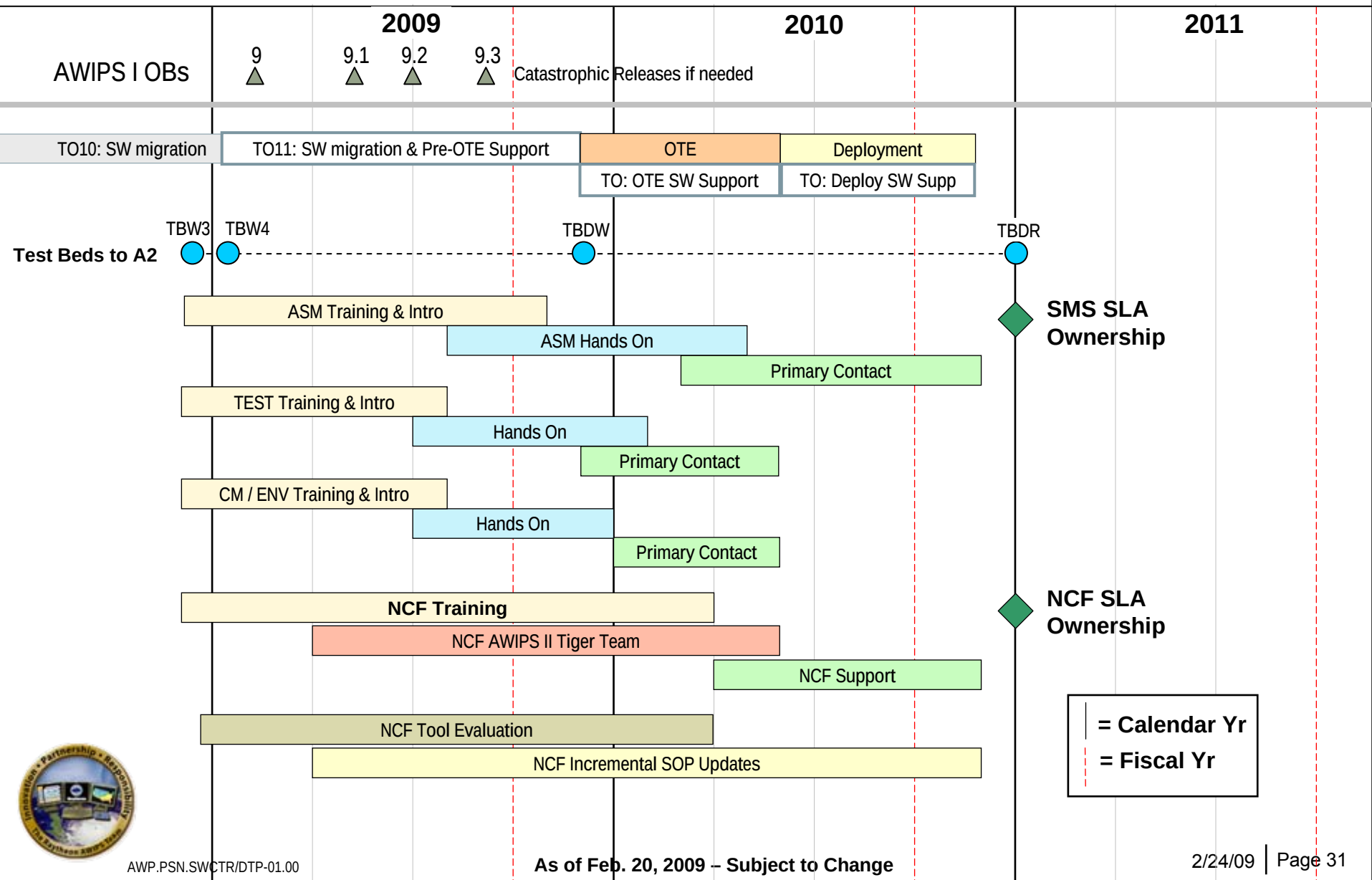
The roadmap is on the following slide

- The plan includes allocated resources for OB9.1, OB9.2, and OB9.3.
- SMS KAP activities have been developed in conjunction with Raytheon Omaha Team (OMA).
- TBDW is rolled over to AWIPS II at the start of OTE. WFO Catastrophic Release testing will be conducted on WNCF to support AWIPS I.
- TBDR is held as AWIPS I until SMS Ownership to allow for RFC Catastrophic Testing or until all RFCs are AWIPS II operational.
- Changes to the AWIPS II Schedule will affect the SMS KAP schedule.

AWIPS II O&M Transition Roadmap

Raytheon

O&M Transition



Deployment and Transition Planning

Catastrophic OB9.3+ Releases

- After OB9.3 is complete, SMS will be available to do Catastrophic Releases. Generally, a Catastrophic Release involves significant loss of functionality that has no workaround. For example:
  - Existing datasets become unavailable.
  - A decoder crashes and cannot be restarted.
  - Messages cannot be transmitted.
- Assumptions
  - ASM has allocated 80 hours per month, which includes LOE time, coding, and/or research associated with the DR(s).
  - SWIT has allocated 32 hours per month, which includes LOE time, testing, and/or any research associated with the DR(s).
  - The 32 test hours will cover the 80 hours from ASM.
  - Hours allocated are not limited to any specific functional area (GFE, MDL, OHD…)
  - Use it or Lose it. Any unused hours, for any month, will not be rolled over.
  - Impacts to AWIPS II will have to be assessed for each change request.

Deployment and Transition Planning

ASM Transition to AWIPS II

- **KAP Intro**
  - OMA works on the component with the ASM team watching, asking questions, and taking notes.
  - OMA has full responsibility for execution and results.
  - All TTs will be directed to OMA following existing processes.
  - Phase-In: In this timeframe, some of the ASM developers will be shifting into the KAP Hands-On phase.
- **KAP Hands-On**
  - ASM works on the component, with assistance, direction, and direct supervision from OMA.
  - ASM and OMA share responsibility for execution, but OMA still retains full responsibility for the results.
  - All TTs will be directed to OMA following existing processes.
  - Phase-In: In this timeframe, some of the ASM developers will be shifting into the KAP Primary Contact phase.
- **KAP Primary Contact**
  - ASM works on the component with OMA reviewing ASM-proposed approach to the task at hand and with OMA's review and approval of deliverables before installation.
  - ASM has full responsibility for execution but shares responsibility for results with OMA.
  - All TTs will be directed to ASM following SMS processes but OMA will assist in reviewing the code.
- **SMS Ownership**
  - ASM takes full responsibility for both execution and results for the component. OMA provides advice only if needed. All TTs will be directed to the ASM following SMS processes.

Deployment and Transition Planning

SWIT Transition to AWIPS II

- **KAP Intro**
  - SWIT gathers and reviews documents from OMA.
  - OMA has full responsibility for execution and results of builds, releases, installs, and tests.
  - OMA and SWIT conduct monthly TIMs, one each for Test, CM, and ENV.
- **KAP Hands-On**
  - SWIT works on builds, releases, install and tests with assistance and direction from OMA.
  - SWIT and OMA share responsibility for execution, but OMA retains full responsibility for the results.
  - SWIT modifies procedure documents as required to support the new AWIPS II paradigm.
  - OMA and SWIT conduct weekly TIMs, one each for Test, CM, and ENV.
  - All ENV TTs will be directed to OMA, OMA assigns select TTs to ENV and will review ENV's proposed resolution, those resolved by OMA will be reviewed by ENV.
- **KAP Primary Contact**
  - SWIT works on builds, releases, installs, and tests, with OMA reviewing and approving SWIT's work.
  - SWIT has full responsibility for execution, but shares responsibility for results with OMA.
  - OMA and SWIT conduct monthly TIMs, one each for Test, CM, and ENV.
  - All ENV TTs will be directed to ENV, but OMA will review proposed resolution
- **KAP Completion**
  - SWIT takes full responsibility for execution and results of builds, releases, installs, and testing.
  - OMA provides advice only if needed.
  - All ENV TTs will be directed to the ENV.
  - Once ASM takes Ownership of AWIPS II, AWIPS I will be archived and locked with the CM tool.

Deployment and Transition Planning

SMS Ownership

- 24/7 Tier 3 support is not available for AWIPS II from SMS until all 122 WFOs and 13 RFCs are operational on AWIPS II. Omaha will provide Tier 3 support during Transition as needed.
- SMS Ownership will begin 30 days after all 122 WFOs and 13 RFCs are operational on AWIPS II. 24/7 Tier 3 support is available.

Deployment and Transition Planning

Mission Assurance Transition to AWIPS II

- Network Control Facility (NCF)
  - Training:
    - AWIPS II familiarization/operations training for Backline and Frontline staff:
      - Training will focus on what NCF staff needs to be able to *Evaluate – Diagnose – Assign – Restore* in the AWIPS II world.
    - Evaluating TDY for OMA to Silver Spring to assist key AWIPS NCF POC staff further immersion.
    - Modify the Basic Engineering Course to address AWIPS II changes.
  - AWIPS II Tiger Team
    - Each shift will have AWIPS I and AWIPS II dedicated staff; gradually shift mix until all sites are operational with AWIPS II.
      - Site phone calls and trouble tickets will be parsed to AWIPS I or AWIPS II team.
      - All trouble tickets are escalated as today for AWIPS I.
      - NCF escalates tickets to OMA during OTE.
      - During OTE, a daily status/troubles report will be produced.

Deployment and Transition Planning

Mission Assurance Transition to AWIPS II

- Network Control Facility (NCF)
  - Tools Evaluation:
    - Basic tools NCF uses not expected to change.
    - Will use Remedy to assign, track and store tickets distinctly for AWIPS I vs. AWIPS II.
    - OpenView (ITO) will be modified to create templates for AWIPS II for items distinct to AWIPS II that might need to be evaluated, tracked, alarmed, etc.
    - NCF's Standard Operating Procedures (SOP) and related processes exist. These need to be updated prior, during, and after transition.

Deployment and Transition Planning

Service Level Agreements

- ASM SLAs
  - AWIPS I SLAs end at SMS Ownership.
  - AWIPS II SLAs begin at SMS Ownership.
  - During transition, AWIPS I TTs will take priority over AWIPS II because the AWIPS I SLAs are still in effect.
  - TTs for AWIPS I will be resolved at best effort after SMS Ownership of AWIPS II (example: NCs).
- SWIT SLAs
  - AWIPS I SLAs end at SMS Ownership.
  - AWIPS II SLAs begin once activities related to a Major Release led by SMS begin.
- NCF SLAs
  - AWIPS I SLAs end at SMS Ownership.
  - AWIPS II SLAs begin at SMS Ownership.