

## Submitted Questions & Answers from TO8 Out-brief

Compiled: 3/6/2008

1. I did not see any reference to JMBL in the presentation or the .ppt documents for TO8. What is the role of JMBL in AWIPS II? Are there any agreements between NWS and DOD regarding JMBL and its use?

While we aren't aware of any NWS/DoD agreements, we have developed an AWIPS-II plug-in that will make requests to a JMBL service and return data to AWIPS-II, but JMBL has no formal role in AWIPS-II.

2. There is growing concern about the purging methods described in TO8. The D2D purging has evolved to meet the needs of the users for analysis on the workstation. A persistent, intelligent process was added to D2D to improve overall performance while adding much needed flexibility to the different purging requirements necessary per product.

Retention period for data is a plug-in configuration item; purging is on a per product basis for the TextDB and IHFS which will retain their AWIPS-I style purging.

3. Slide 5 – What is the role of the “proxy” as described in the slide? It wasn't clear. Also, Quinlan ID3 algorithm was mentioned here. Can someone write a paragraph (with an example) on the use of this algorithm? I researched it, but it could be applied in many different areas of the system.

The “proxy” is a future growth item to enable NWS service interfaces with outside networks. It would contain the high level services for security, discovery, etc. This is currently the approach being developed for DOD programs for sharing across networks.

The Quinlan ID3 algorithm breaks apart the dataURIs that are under subscription. The algorithm builds an optimized decision tree structure using standard entropy calculations to balance the tree. When new dataURIs come in from the IngestSrv they can be compared very quickly and action taken to update an animate loop or menu item. Yes, it could be applied to other areas of the system.

4. Slide 10 – The relationship between inventories and #-of-frame request isn't obvious. How does the system agilely handle this interaction?

When a menu request for data is made (such as satellite) the XML bundle contains the dataURIs desired with a wild card for time fields. The data loader uses the time matching algorithm (D2D port) and the number of frames selected on the main menu to retrieve as much data as exists if the frame count isn't satisfied starting with the latest data. All data loaded must go through the time matching algorithm. The bundle has a frame count field which currently isn't used from the menu system.

5. Slide 11 – The shader language and GPU use has obvious performance improvements. However, there are two areas of concern
  - a. The GPU does not have an OS with timesharing on it. How will this resource be brokered? Is it possible that deadlocks can occur? I have concerns that this may become a resource contention without any type of service prioritizing/intercepting its usage. With the 3-headed workstation and multiple sessions of applications currently in use, this may become a resource problem.

The GPU is managed as a limited resource with locking, blocks, and concurrency access. This is done automatically and not something an application programmer has to worry about. If it was not managed, normal operation of a workstation would be impossible.

- b. My limited research of the shader language points out that this can be implemented specific to the hardware, therefore not portable. Are there absolute assurances this will not occur?

While there are no absolute assurances of anything in this world except “death and taxes” as the saying goes, we have and are doing things to enable and preserve portability. We are using the standard that has the widest support and was created by NVIDIA and conforms to OpenGL 2.0. Our use of shader is very localized and limited but plays a critical role. We are testing on new graphics cards every chance we get and the biggest issue is with graphics device drivers not the hardware. Often the drivers lag behind the hardware. We intend to put more active card checks at install time to let the user know if the card is adequate or not.

6. Slide 15 – The XML configuration will be a welcome upgrade. However, the current system has very readable text language for customizing, not embedded in XML. Will there be a tool(s) that can be used for customizing these configurations?

Yes, we are creating a tool that is implemented as a plug-in to the Eclipse IDE in the ADE. It edits bundles, and we will be adding editing capability for the other XML files like the style rules etc. Ultimately no one should have to edit XML directly. The ported D2D color editor actually edits the XML color tables or creates new ones. We currently have a map builder under the CAVE menu which creates map XML bundles for adding new scales as part of the localization. Some of the configuration is automatic such as the creation of “dataURIs” (similar to dataKeys in D2D).

7. Slide 16 – AWIPS has been burned by software/hardware that is sunset out during the AWIPS lifecycle. If this happens with Eclipse, what will be the impact and what risks could be mitigated now to minimize that impact?

The AWIPS lifecycle is very long, and there is obviously a chance that any licensed COTS or OpenSource SW could “sunset”. The question of a project going dormant was raised and answered early in the SW CTR project. We developed the ASWIPS II

architecture to allow for much easier replacement of components than is currently possible with AWIPS I components. We also currently review versions and projects that are losing support at the beginning of every task order and adapt as needed. For, example Jython was a project that was sun setting so we switched to JavaScript which is now being built into Java. Eclipse RCP sun setting would have the biggest impact but if it does that means that something better got created and we would shift to that. Given the very broad industry use of Eclipse any shift to another product is highly likely to be publicized well in advance of the event. We also have the source of open source projects we use so that they can continue to be maintained if necessary.

8. Slide 17 – The use of scales in D2D is different than the boundaries in GFE. The D2D WFO scale has the WFO boundaries necessary to show the warning area responsibility of the office. However, GFE has extended this scale to facilitate the ISC grids continuity between offices. The three tabs (D2D, GFE, and HydroApps) use the same viewing window. How will this work to adapt between the applications? This may be a non-issue if the operational concept precludes issuing W/W/A and working on GFE at the same time. But, this could be an issue in the future.

What was demonstrated was the state of the main D2D pane transferring over to the GFE and Hydro perspectives. In actual practice, each of those perspectives will have their own localization and initialization. WarnGen would only be available from the D2D perspective. However, the perspectives approach raise the possibility of multiple applications being integrated and used together with new methods, or “Conops”, which would need to be worked out by the NWS.

9. Slide 20 – Want to make sure that Raytheon understands that there are many more datasets besides grids in the volume browser.

We understand and during T09 we are putting significant effort into derived parameters which create new data sets that are available from the volume browser. We are using the “D2D virtual field table” as a guide for this.

10. Slide 22 – Will subscriptions for point data be available for individual stations? Also, the legend colors do not match the plot colors (like in the current system).

Yes, all point data has a unique dataURI which makes it individually sub-scribble. We are using this capability in AvnFPS and other MDL apps. Not sure what is meant by the colors not matching?

11. Slide 33 – The JNI is native to a system. Will this cause a problem between different systems in the office? May want to really think this through.

We are aware of this situation and build two versions of all libraries. One for unix/linux in \*.so format and one in windows \*.dll format. This complicates the build but enables platform independence. The entire D2D metlib directory has a JNI interface generated by GlueGen.

12. Slide 37 – Will the LDM be part of the operational system? The LDM adds a much more flexible way to filter unnecessary data from the CP than AWIPS currently has. I would suggest that the CP be used in full throttle w/o filtering in the LDM to more closely resemble the forecast office data feeds. At this point (as described in the presentation), stability numbers would not truly represent the real-time aspect of a forecast office.

We are currently running LDM in Omaha as you suggested with the CPs getting the full load and LDM filters on the DX box set for WFO flow. LDM has worked very well for us and is our preferred foundation for the CPs.

13. Slide 38 – What tools are used for cluster balancing? How is it enabled?

The installers install everything necessary for clustering and a small procedure is used to configure it. Jim Williams at headquarters has done this several times and has clustered up to 4 servers together. Clustering is basically enabled by the capabilities built into “activeMQ” and JGROUPS. JGROUPS is used to control write locks on the HDF5 files. ActiveMQ has built in clustering support for JMS queues/topics. Because of the MULE SEDA interface to ActiveMQ the load balancing is automatic.

14. As we move forwards with each task order, should we expect substantial changes in the previously delivered javascript extensions? The reason being, if we have ported an app to one version of the javascript extensions, will we have to re-port the app with each delivery?

Follow-up discussion confirmed that the question was really addressing Microengine extensions for which there could be new functions or modification to existing ones. We don't expect major changes to existing Microengine functions, but will add new ones as needed. Raytheon will communicate changes with each SW Delivery and will try to inform NWS of anticipated changes as soon as possible.

15. How much change do you anticipate for the IHFS-DB? When will the decision to store metar data only in the meta-data db and not in the IHFS-db be made? This decision may have an impact on local app porting.

We do not anticipate changes in the IHFS database for AWIPS II, Release 1. The decision to not store metar data in the IHFS has already been made.

16. How will procedures be ported into bundles? (Will there be a translator?)

Procedures will be ported to bundles manually. Due to the differences and complexities involved, we don't consider developing a translator to be cost effective.

17. How will existing local updates to templates be ported into the new velocity language? (Will there be a translator?)

We think in most cases it would be easier to make the modifications by hand rather than translate, and therefore do not plan to develop a translator.

18. What is the reference for the Jim Ramer paper used for the development referenced in slide 25?

Here is the link to Frank's reference.

<http://fxa.noaa.gov/uiwg/WARN-BY-POLYGON/warnByPolygon.html>

19. What preparatory work had to be completed prior to magically switching between the two localizations?

The localization data must be loaded for each site. This data would be loaded once and centrally stored; only changes would need to be made after the initial load. The localization data could be loaded during UFEs.

20. Is the replay (displaced real time) mode open source or proprietary?

The replay mode is not Open source or proprietary. It was developed by Raytheon as part of an Internal Research and Development effort. Government data rights are the same as for other code we develop and deliver to the NWS.

21. On slide 5, it isn't clear what the Proxy process does wrt the AWIPS II services.

The "Proxy" is for future growth to enable the centers to communication using services to other networks outside of the NWS. The proxy handles the high level SOA services for discovery and security etc.

22. On slide 7, when does the plug-in registry table get created? When does it get written to?

The plug-in registry is the table "plug-in\_version" in the metadata database. This table is created during the install procedure when the initial setup sql scripts are run. When the plug-in is first created it writes the entry to the plug-in\_version. On a new install the plug-in for a specific data type is created when the first piece of data hits its endpoint, then the framework creates the metadata table, hdf5 file, and so on.

23. On slide 8, are there other purge criteria besides retention time?

Retention time is the only purge criteria for metadata and hdf5 files. The textDB and IHFS have their own separate mechanisms.

24. On slide 10, you mentioned 1-minute updates. Does this apply to all data types or will it vary per data type?

This is common to all data types. The time is configurable in the “index.xml” file which controls the configuration for the IndexSrv. 1-minute was just a first guess. Radar may be an example of a data type where it may be desirable to bypass the URIAggregator but this capability would have to be added.

25. On slide 13, could you explain what a Mapping Vertex Array is and how it works?

Vertex array is an OpenGL construct that allows a set of vertices to be created then transferred to the graphics card in one operation. It is used in several locations in CAVE. For re-projecting data onto a map, CAVE calculates a vertex array that represents the shape of the map. CAVE uses the geoTools transforms for this. Data then gets loaded into the card and the card warps the data to the map.

26. On the current AWIPS, changing scales is an implied “clear”. Will this work the same in TO8 WRT storing the history?

Yes, CAVE works the same way. Hitting clear or changing panes forces an entry on the history list.

27. On slide 24, where does Hibernate fit into scheme of things with respect to JDBC and Derby?

Hibernate is a layer above JDBC and performs the RDBMS column mapping to object attribute translation automatically. Derby is an embedded RDBMS that AWIPS-II is not using directly. Derby is used indirectly as a backing store for JMS messages in “activeMQ”.

28. Frank mentioned that the data are stored in native format. Looking at the HDF5 structure, it looks like hdf5 is used primarily as a directory structure. Is this correct?

Yes, the HDF5 structure directly reflects the dataURI of the item. The metadata repository for the plug-in has the records that map a specific data item and its metadata to the location in the HDF5. The data in the HDF5 is in the ingested map projection but in most cases is decoded to be more useable by CAVE.

29. Does CAVE have a built-in screen capture, or is a third party utility (e.g. ImageMagick import) required?

Under “File>Capture Window>Save As” in CAVE is a dialog that saves what is currently in the main pane to a png file. It does this by dumping the graphics card and converting it into the PNG file so it is a very accurate representation of what is visible on the screen.