



Weather Information Database (WIDB) Information Technology System Design Specification

Appendix B – Threshold Product ROM Volumes/Frequencies

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1 Introduction

Appendix B provides, for NOAA generated products, an ROM estimation of network bandwidth required to send data from origin sources to its corresponding CIES, and to send NOAA data from CIES to FAA requestors. In addition, Appendix B provides initial archive storage estimates required for CIES sizing purposes. Bandwidth requirements have been derived from product sizes, latencies, and number of users requesting data.

2 Assumptions

Assumptions have been made in order to calculate bandwidth and storage requirements.

- Overall latency is half of the product generation frequency.
- 20% of the overall latency is allocated to ingesting the data into the CIES upon generation of the data.
- Remaining 80% of overall latency is allocated to delivery of data to requesting consumers.
- Number of unique users represents the number of ARTCC's that may request the data (assumed $21(\text{ARTCCs}) + 1 (\text{ARCC})$ for this analysis).
- Archival requirement of 15 days has been documented in NextGen documents.
- Future multiplier of 1x (same resolution, update time is assumed as is currently supported)
- In some cases, average product sizes are estimated to be the mean of the min and max sizes.

3 ROM Matrix

The information in the matrix below, specifically product sizes and frequencies, have been derived from numerous sources. In some cases, an educated approximation was used. Fields that are empty are TBD.

| Product | # of products | Min size (bytes) | Max size (bytes) | Ave size of product in bytes | Future multiplier (e.g improved resolution) | Total size of products per update cycle (in bytes) | Frequency between product updates (in minutes) | Updates per day | Daily amount (in Mbytes) | Archive reqmt (in days) | Storage needs (in Mbytes) | Overall latency (in seconds) | Latency allocated to availability to CIES after generation (in sec) | Latency allocated for transmission to all consumers (in sec) | # of unique consumers making a request | Comm rqmt (Mbps) from source to CIES | Comm rqmt (Mbps) to consumers |
|--|---------------|------------------|------------------|------------------------------|---|--|--|-----------------|--------------------------|-------------------------|---------------------------|------------------------------|---|--|--|--------------------------------------|-------------------------------|
| Textual Products | | | | | | | | | | | | | | | | | |
| TAF | 250 | | | 400 | 1 | 100000 | 60 | 24 | 2.4 | 15 | 0.000036 | 1800 | 300 | 1500 | 22 | 0.002667 | 0.0011733 |
| PIREP | | | | | | | | | | | | | | | | | |
| SIGMET | | | | | | | | | | | | | | | | | |
| AIRMET | | | | | | | | | | | | | | | | | |
| CCFP | | | | | | | | | | | | | | | | | |
| ADA-Alarm/Alert Administrative Message (Urgent Notification) | | | | | | | | | | | | | | | | | |
| ADM-Alert Administrative Message | | | | | | | | | | | | | | | | | |
| ADR-NWS Administrative Message (External) | | | | | | | | | | | | | | | | | |
| FTM-Free Text Message | | | | | | | | | | | | | | | | | |
| AIR-International AIRMET | | | | | | | | | | | | | | | | | |
| ARP-AIREP | | | | | | | | | | | | | | | | | |
| AWW-Aviation Weather Warning | | | | | | | | | | | | | | | | | |
| CFP-Collaborative Convective Forecast | | | | | | | | | | | | | | | | | |
| CWA-Center (CWSU) Weather Advisory | | | | | | | | | | | | | | | | | |
| CWS-Center (CWSU) Weather Statement | | | | | | | | | | | | | | | | | |
| FTA-Terminal Forecast | | | | | | | | | | | | | | | | | |
| MIS-Meteorological Impact Statements | | | | | | | | | | | | | | | | | |
| OAV-Other Aviation Products | | | | | | | | | | | | | | | | | |
| PIR-Pilot Report & Urgent PIREPS | | | | | | | | | | | | | | | | | |
| PRC-State Pilot Report Collective | | | | | | | | | | | | | | | | | |
| TAF-International Terminal Forecast | | | | | | | | | | | | | | | | | |
| TAP-Terminal Alerting Product | | | | | | | | | | | | | | | | | |
| WA1-WA9-AIRMET (Northeast U.S., Southeast U.S., North Central U.S., South Central U.S., U.S. Rocky Mountains, U.S. West Coast, Juneau, Alaska, Anchorage, Alaska, Fairbanks, Alaska) | | | | | | | | | | | | | | | | | |
| 18A-18-hour Wintem | | | | | | | | | | | | | | | | | |
| 24A-24-hour Wintem | | | | | | | | | | | | | | | | | |
| AFD-Area Forecast Discussion | | | | | | | | | | | | | | | | | |
| AFP-Area Forecast Products | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|--|-----|---------|---------|--------|---|----------|------|----------|-------------|----|-------------|-------|-------|--------|----|----------|-----------|
| Product 62 - Storm Structure | 155 | 3,604 | 20,830 | 12217 | 1 | 1893635 | 5.91 | 243.6548 | 461.3932995 | 15 | 6920.899492 | 177.3 | 35.46 | 141.84 | 22 | 0.427216 | 2.3496881 |
| Product 65 - Layer Composite Reflectivity Maximum (low level) | 155 | 1,378 | 5,356 | 3367 | 1 | 521885 | 7.32 | 196.7213 | 102.6659016 | 15 | 1539.988525 | 219.6 | 43.92 | 175.68 | 22 | 0.095061 | 0.5228356 |
| Product 66 - Layer Composite Reflectivity Maximum (middle level) | 155 | 1,348 | 4,180 | 2764 | 1 | 428420 | 7.33 | 196.4529 | 84.16436562 | 15 | 1262.465484 | 219.9 | 43.98 | 175.92 | 22 | 0.07793 | 0.4286148 |
| Product 67 - Layer Composite Reflectivity with AP removed | 155 | 1,360 | 5,374 | 3367 | 1 | 521885 | 7.33 | 196.4529 | 102.525839 | 15 | 1537.887585 | 219.9 | 43.98 | 175.92 | 22 | 0.094931 | 0.5221223 |
| Product 75 - Free Text Message | | | | | | | | | | | | | | | | | |
| Product 90 - Layer Composite Reflectivity max - high level | 155 | 1,348 | 2,602 | 1975 | 1 | 306125 | 7.34 | 196.1853 | 60.05722071 | 15 | 900.8583106 | 220.2 | 44.04 | 176.16 | 22 | 0.055609 | 0.305847 |
| Product 93 - ITWS Digital Base Velocity | | | | | | | | | | | | | | | | | |
| Product 98 - Composite Reflectivity edited for AP | | | | | | | | | | | | | | | | | |
| Product 134 - High Resolution Digital VIL | 155 | 168,000 | 168,000 | 168000 | 1 | 26040000 | 7.32 | 196.7213 | 5122.622951 | 15 | 76839.34426 | 219.6 | 43.92 | 175.68 | 22 | 4.743169 | 26.087432 |
| Product 135 - High Resolution Enhanced Echo Tops | 155 | 127,000 | 127,000 | 127000 | 1 | 19685000 | 7 | 205.7143 | 4049.485714 | 15 | 60742.28571 | 210 | 42 | 168 | 22 | 3.749524 | 20.622381 |
| Product 141 - Mesocyclone | 155 | 150 | 3,364 | 1757 | 1 | 272335 | 5.99 | 240.4007 | 65.46951586 | 15 | 982.0427379 | 179.7 | 35.94 | 143.76 | 22 | 0.06062 | 0.3334096 |
| Product 143 - Tornado Vortex Signature Rapid Update* | 155 | 2,142 | 5,112 | 3627 | 1 | 562185 | 5.97 | 241.206 | 135.6024121 | 15 | 2034.036181 | 179.1 | 35.82 | 143.28 | 22 | 0.125558 | 0.6905678 |
| Radar Products total | | | | | | | | | 14758.27707 | | 221374.1561 | | | | | 13.66507 | 75.157892 |

GOES data (including both satellites)

| | | | | | | | | | | | | | | | | | |
|-------------------------|---|-------------|-------------|-----------|---|-----------|----|----|-------|----|---------|-----|----|-----|----|----------|-----------|
| Water Vapor (channel 3) | 2 | 49,600,000 | 74,400,000 | 62000000 | 1 | 124000000 | 15 | 96 | 11904 | 15 | 178560 | 450 | 90 | 360 | 22 | 11.02222 | 60.622222 |
| Visible (channel 1) | 2 | 198,400,000 | 297,600,000 | 248000000 | 1 | 496000000 | 15 | 96 | 47616 | 15 | 714240 | 450 | 90 | 360 | 22 | 44.08889 | 242.48889 |
| Infrared | 2 | 49,600,000 | 74,400,000 | 62000000 | 1 | 124000000 | 15 | 96 | 11904 | 15 | 178560 | 450 | 90 | 360 | 22 | 11.02222 | 60.622222 |
| Infrared | 2 | 49,600,000 | 74,400,000 | 62000000 | 1 | 124000000 | 15 | 96 | 11904 | 15 | 178560 | 450 | 90 | 360 | 22 | 11.02222 | 60.622222 |
| Total GOES data | | | | | | | | | 95232 | | 1428480 | | | | | 88.17778 | 484.97778 |

POES Image Data

| | | | | | | | | | | | | | | | | | |
|-----------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 1J1F-JUNEAU | | | | | | | | | | | | | | | | | |
| 1AF-ALASKA_AF | | | | | | | | | | | | | | | | | |
| 1F2F-FAIRBANKS2 | | | | | | | | | | | | | | | | | |
| 1ABF-BERING | | | | | | | | | | | | | | | | | |
| 1AKF-ALASKA_AK | | | | | | | | | | | | | | | | | |
| 1F1F-FAIRBANKS1 | | | | | | | | | | | | | | | | | |
| 1ACF-ARCTIC | | | | | | | | | | | | | | | | | |
| 1KKF-KAMCHATKA | | | | | | | | | | | | | | | | | |
| 4J1F-JUNEAU | | | | | | | | | | | | | | | | | |
| 4AF-ALASKA_AF | | | | | | | | | | | | | | | | | |
| 4F2F-FAIRBANKS2 | | | | | | | | | | | | | | | | | |
| 4ABF-BERING | | | | | | | | | | | | | | | | | |
| 4AKF-ALASKA_AK | | | | | | | | | | | | | | | | | |
| 4A1-ANCHORAGE | | | | | | | | | | | | | | | | | |
| 4A2-ALEUTIANS | | | | | | | | | | | | | | | | | |
| 4F1F-FAIRBANKS1 | | | | | | | | | | | | | | | | | |
| 4ACF-ARCTIC | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | |
|------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--------------------|
| 1-12 hour Probability | | | | | | | | | | | | | | | | | | | | |
| NCVA | | | | | | | | | | | | | | | | | | | | |
| TBD | | | | | | | | | | | | | | | | | | | | |
| Total ADDS Data | | | | | | | | | | | | | | | | | | | | |
| GRAND TOTALS | | | | | | | | | | | | | | | | | | | | 105.4979 579.89599 |

3.1 Conclusions

The intent of this matrix is to estimate ROM volume of data generated from NOAA and with a set of given assumptions, derive an estimation of bandwidth requirements for transfer of NOAA data to FAA, as well as expected CIES storage requirements. The majority of the matrix is TBD, therefore the grand totals for bandwidth requirements does not accurately depict the situation. Currently, work is underway to determine the sizes and frequencies for the most of the products listed above to allow for completion of this table.