COPC WG/CSAB

ESPC 2.0/PDA Status

Chris Sisko

NESDIS/OSPO

Telephone: 301-817-4783

Email: Chris.A.Sisko@noaa.gov

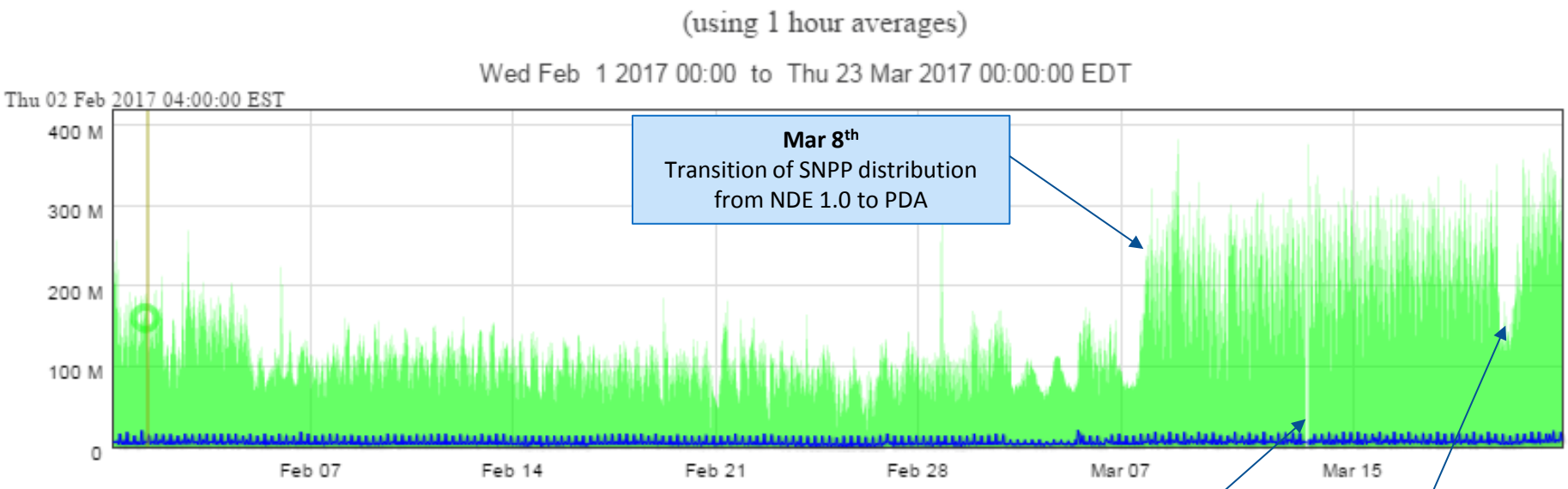
Agenda

- NDE 2.0/PDA Ops Status
- Recent System Anomalies
- GOES-16 Data Availability on PDA
- PDA User Allocation
- PDA Products to DoD
- DAPE

PDA Ops Environment Status

- NDE 2.0, PDA and EI (ESPC new network) status:
  - Put into operations on Dec 5th, 2017 at 12:00 UTC
  - Supported GOES-16 ABI data activations on Mar 1, 2017
  - Transitioned to full operations (B2.0 transition) on Mar 8, 2017 at 15:00 UTC
- Two significant data disruptions/events to date:
  - Mar 11, 2017 – OCSP responder/repeater outage
  - Mar 21, 2017 – network issue on COPC links
- Transition status
  - NAB → NDE 1.0 dataflow is working well
  - Majority of users are on PDA at this time
  - Next big PDA data activations expected in May/June when GOES-16 ABI data reaches provisional maturity

PDA Egress Rates through N-Wave



Mar 8th
Transition of SNPP distribution from NDE 1.0 to PDA

Mar 11th
Data Outage for all push users

Mar 21st
Data Outage for USAF 557th, Navy FNMOC and Navy NAVO. Residual impacts to EUMETSAT

User Load (PDA to NWAVE)
~3.25 TB/day

System Ingest from NWAVE (Met-8)
~65 GB/day

Recent System Anomalies

- March 11, 2017 - OCSP responder/repeater issue that caused x.509 certs to fail. This caused an outage for all users who have data pushed to them from PDA. The outage length was ~5.5 hours
- March 21, 2017 - PDA push data to USAF 557th failed. The primary and alternate network link on the DoD USAF side failed. The network teams on both ends of the interface analyzed the issue and were able to isolate the problem to a firewall within the COPC network segment managed by NCEP. The outage length was ~15 hours. Impacted users include 557th, FNMOC, NAVO

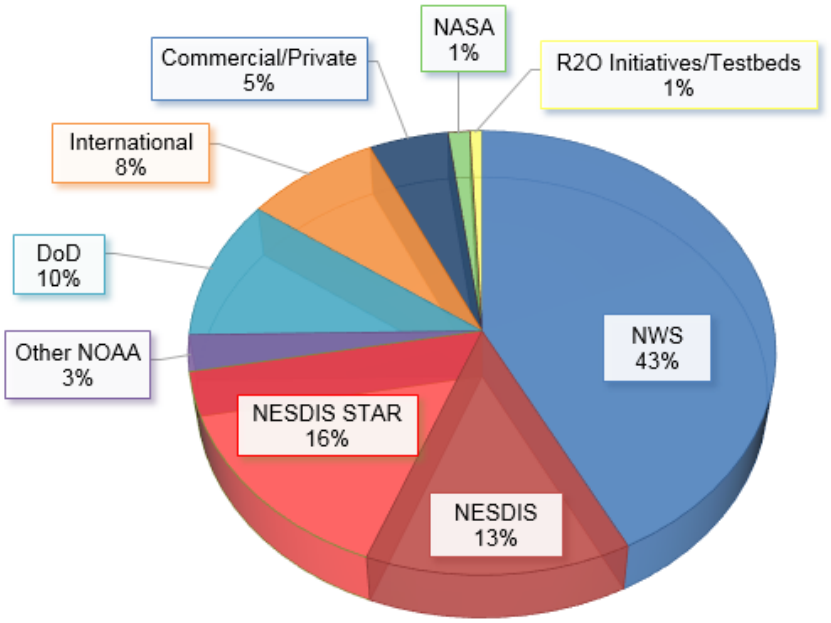
PDA and GOES-16

- PDA is providing GOES-16 data to CAL-VAL and approved Pre-Beta Users
- Access to GOES-16 data will remain restricted until reaching Provisional Maturity
  - Users need to be approved by GOES-R Chief Scientist for Early/Beta Access (current approved users include EUMETSAT, DoD, CMC, INPE, remaining NWS (especially NCEP Centers)
- The Provisional PS-PVRs for all product groups are tentatively scheduled as follows:
  - Jun 1st, 2017 - ABI L1b and CMI
  - Dec 2017 - ABI L2+ (6 months after Handover to OSPO)
  - All other products are tentatively scheduled to be provisional after Aug 16th, 2017

PDA Data Allocation - System Capacity Overview

- PDA was initially designed with a data volume capacity egress rate of ~40 TB/day (at 25 Gbps); PDA and infrastructure is scalable to meet growing demand
- As of January 30, 2017 ~41.55 TB/day has been allocated to approved users

PDA Daily Data Allocation by Major User Category (TB/day)		
NOAA	NWS	17.65
	NESDIS	5.55
	NESDIS STAR	6.75
	Other NOAA	1.1
NASA		0.55
DoD		4.25
Commercial/Private		2.0
International		3.4
R2O initiatives/Testbeds		0.3
Total		**41.55**



PDA Egress - Daily Data Allocation

Note - These data allocations per user are maximums and for many of the big data consumers it is unlikely they will fully utilize as much data as currently allocated over the next 12-24 months

PDA Products going to DoD

USAF 557th Weather Wing		
ATMS-SCIENCE-RDR	VIIRS-CTT-EDR	VIIRS-M2ND-EDR
ATMS-SDR	VIIRS-DNB-GEO	VIIRS-M3-SDR
ATMS-SDR-GEO	VIIRS-DNB-SDR	VIIRS-M3RD-EDR
ATMS-TDR	VIIRS-I1-IMG-EDR	VIIRS-M4-SDR
ATMS_BUFR	VIIRS-I1-SDR	VIIRS-M4TH-EDR
CRIS-SCIENCE-RDR	VIIRS-I2-IMG-EDR	VIIRS-M5-SDR
CrIS-SDR	VIIRS-I2-SDR	VIIRS-M5TH-EDR
CrIS-SDR-GEO	VIIRS-I3-IMG-EDR	VIIRS-M6-SDR
CrIS_C0399_BUFR	VIIRS-I3-SDR	VIIRS-M6TH-EDR
OMPS-NP-EDR	VIIRS-I4-IMG-EDR	VIIRS-M7-SDR
OMPS-NP-GEO	VIIRS-I4-SDR	VIIRS-M8-SDR
OMPS-NP-SDR	VIIRS-I5-IMG-EDR	VIIRS-M9-SDR
OMPS-NPSCIENCE-RDR	VIIRS-I5-SDR	VIIRS-MOD-GEO
OMPS-TC-EDR	VIIRS-IMG-GEO	VIIRS-MOD-GEO-TC
OMPS-TC-GEO	VIIRS-IMG-GEO-TC	VIIRS-MOD-GTM-EDR-GEO
OMPS-TC-SDR	VIIRS-IMG-GTM-EDR-GEO	VIIRS-NCC-EDR
OMPS-TCSCIENCE-RDR	VIIRS-IST-EDR	VIIRS-NCC-EDR-GEO
VIIRS-AF-EDR	VIIRS-LST-EDR	VIIRS-OCC-EDR
VIIRS-Aeros-EDR	VIIRS-M1-SDR	VIIRS-SA-EDR
VIIRS-Aeros-EDR-GEO	VIIRS-M10-SDR	VIIRS-SCD-BINARY-SNOW-FRAC-EDR
VIIRS-CBH-EDR	VIIRS-M11-SDR	VIIRS-SCD-BINARY-SNOW-MAP-EDR
VIIRS-CCL-EDR	VIIRS-M12-SDR	VIIRS-SCIENCE-RDR
VIIRS-CEPS-EDR	VIIRS-M13-SDR	VIIRS-SIC-EDR
VIIRS-CLD-AGG-GEO	VIIRS-M14-SDR	VIIRS-SST-EDR
VIIRS-CM-EDR	VIIRS-M15-SDR	VIIRS-ST-EDR
VIIRS-COT-EDR	VIIRS-M16-SDR	VIIRS-SusMat-EDR
VIIRS-CTH-EDR	VIIRS-M1ST-EDR	VIIRS-VI-EDR
VIIRS-CTP-EDR	VIIRS-M2-SDR	

NAVY FNMOC
GMASI-NH-End_Product_SIM_bin
GMASI-SH-End_Product_SIM_bin
NPOES_GFS_(00hr)
NPOES_GFS_(03hr)
NPOES_GFS_(06hr)
NPOES_GFS_(09hr)
NPOES_GFS_(12hr)
NPOES_GFS_(15hr)
NPOES_GFS_(18hr)
NPOES_GFS_(21hr)
NPOES_GFS_(24hr)
NPR-MIRS-IMG_33min_v11
NUCAPS_CCR
NUCAPS_EDR
SWP_AP_Flux
SWP_DGD
SWP_DSD
VIIRS_WINDS_BUFR
NAVY NAVO
ABI-L1b-RadF
AMSR2_L1R
ASCAT-OSW-25KM-EP-Binary
MIRS_ATMS_SND

Notes regarding DAPE

- Access to new datasets (**including SNPP**) are serviced only from PDA; DAPE will maintain data continuity of its existing legacy product suite to DoD (with the exception of SNPP).
- Current NESDIS position regarding DAPE and PDA:
  - continue supporting/sustaining DAPE in terms of legacy data flow
  - new mission data requests will be serviced by PDA (today)
- This current strategy will eliminate potential disruptions to existing services while the final path forward regarding DAPE functionality is determined; this approach also gives DoD an opportunity to build confidence with PDA distribution.
- PDA operations - ESPC feeds DoD directly any new mission data they require; legacy product distribution will remain on DAPE.

Many Thanks!

Background Slides

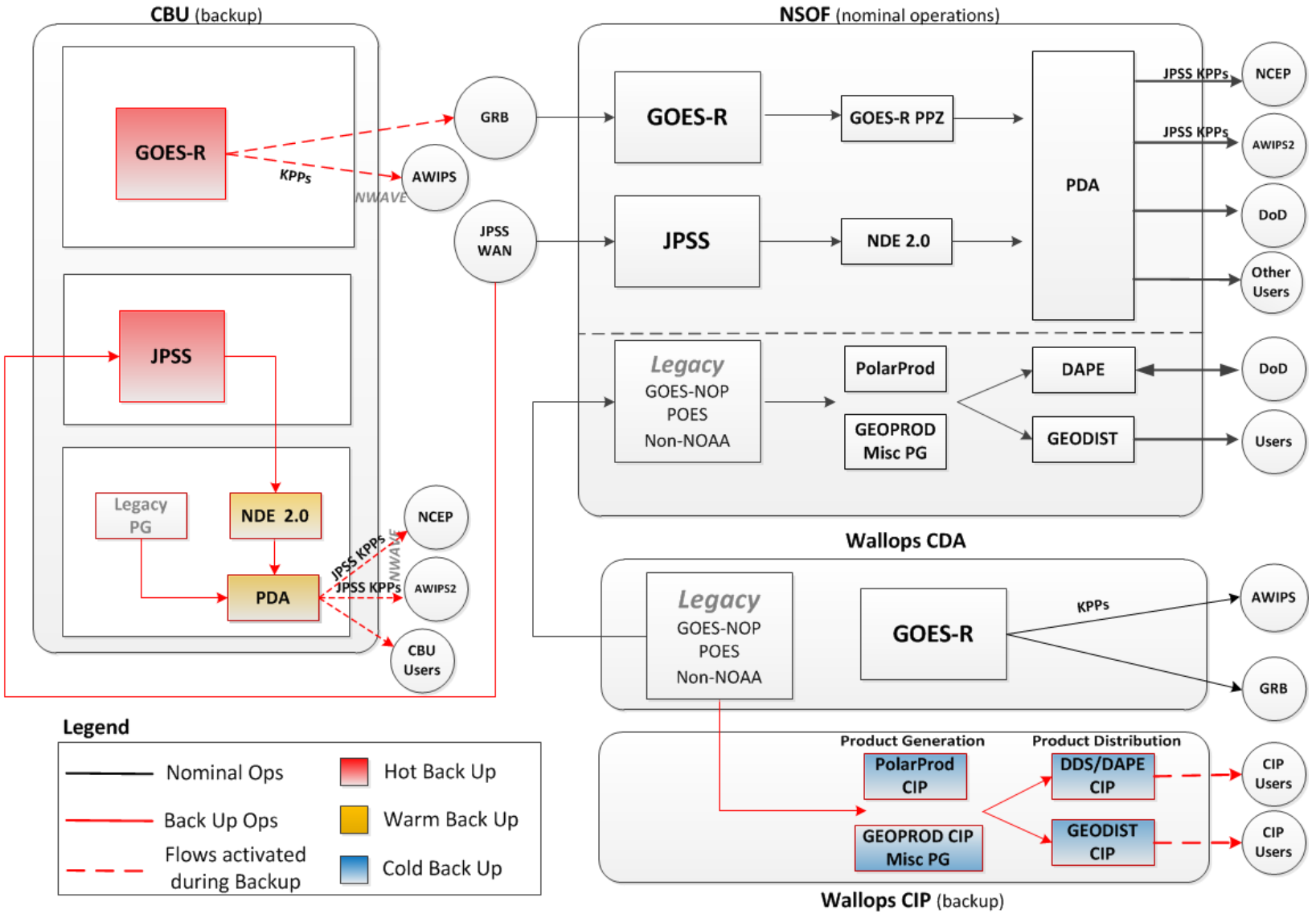
Product Distribution and Access (PDA) Overview

- Represents NESDIS's enterprise distribution for real-time users
- Provides NESDIS with a scalable Service Oriented Architecture (SOA) that functions as both a high availability and high performance distribution system
- Enables users to tailor products in order to meet their unique mission requirements, including latency
- Enhances IT security posture by utilizing in-depth defenses against evolving threats
- PDA at NSOF (Suitland, MD) will support many missions; however, PDA at CBU (Fairmont, WV backup site) will only support the JPSS missions

Data Volume Capacity:	Peak Throughput: 23.5 Gbps (initial)
Ingress: 14.25 TB/day	NWAVE: 10 Gbps (primary & back-up)
Egress: 35.92 TB/day	Network to Edge – scalable to 120 Gbps

TB – Terabyte (1 TB = 10^{12}) bytes
Gbps – Gigabit per second (1 Gigabit = 10^{9} bits per second)

ESPC Data Operations

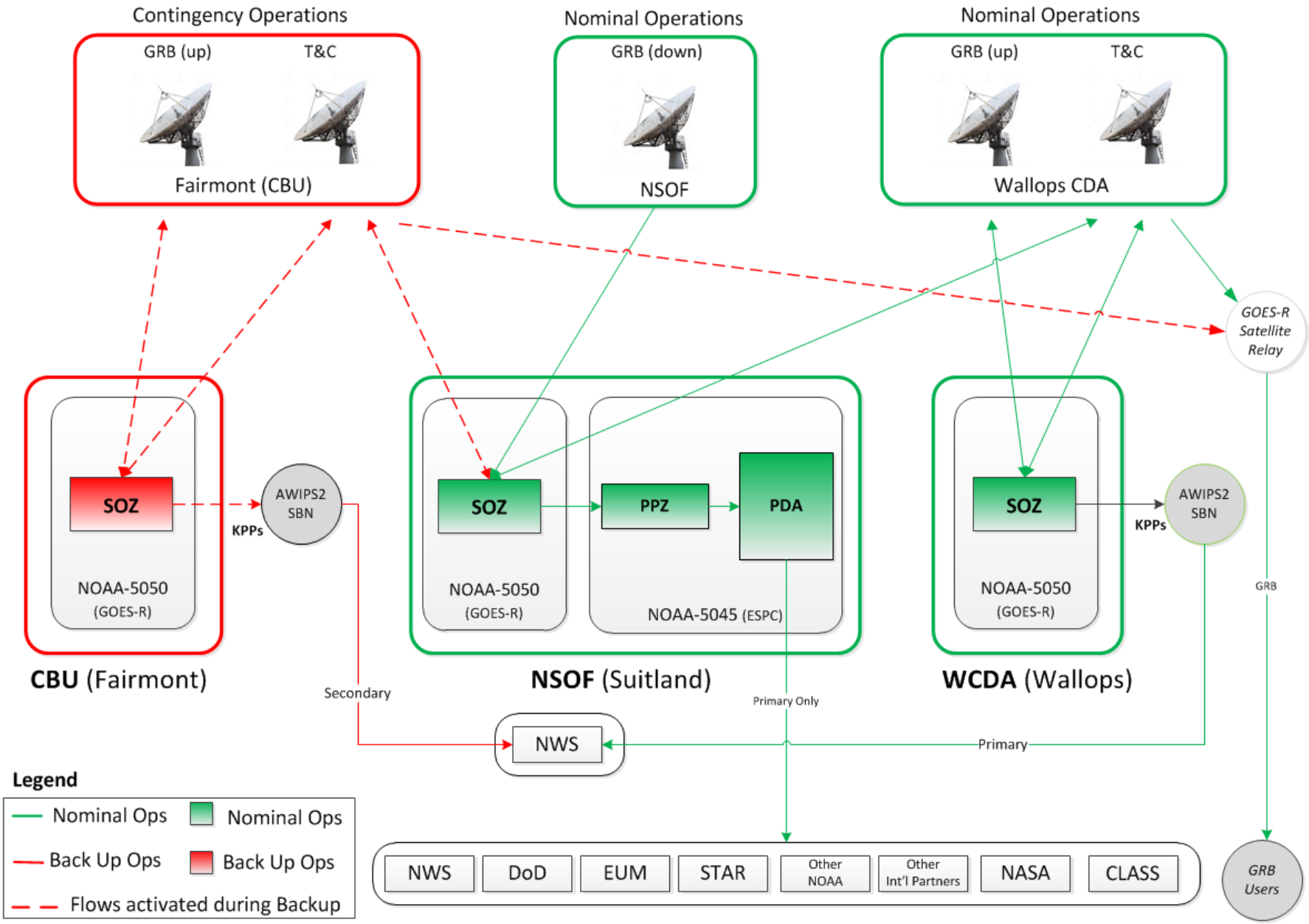


ESPC PDA Operations – User Prioritization

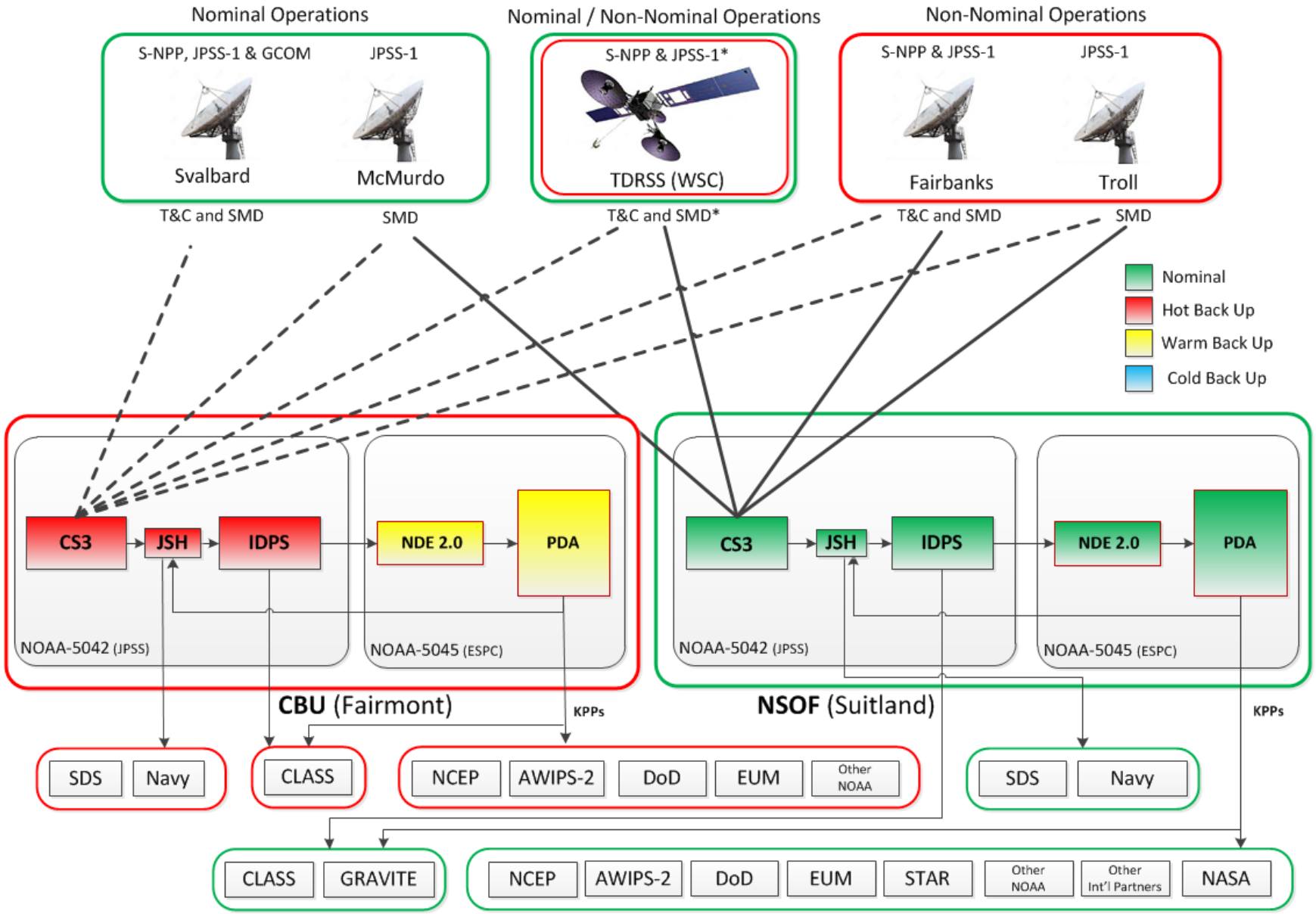
- PDA supports near real-time users – prioritized according to most critical mission need first.
- PDA operators can perform load shedding of the lowest priority users – this is a system management feature that guarantees resources for the highest priority users if so needed.
- The new ESPC network infrastructure is a high performance, horizontally scalable network; however, distribution time is governed by the slowest link speed between source and destination.
- The Prioritization approach, table below, allows ESPC to manage user return to service expectations during significant anomalies/outages.

Operational Prioritization Approach	
1	Life & Property / National Interest Missions
2	Int'l Agreement Missions / NRT NOAA-NASA Environmental Missions/ Launch Support-Cal Val
3	External Mission Support (i.e. AR) / Data Preservation/Archive
4	Operations Test Support
5	Mission (Development) Test Support / Long term Approved RT Request
6	Prototype dataflow / temporary dataflows or tests – research to operations

Future Architecture/Future Geo Operations



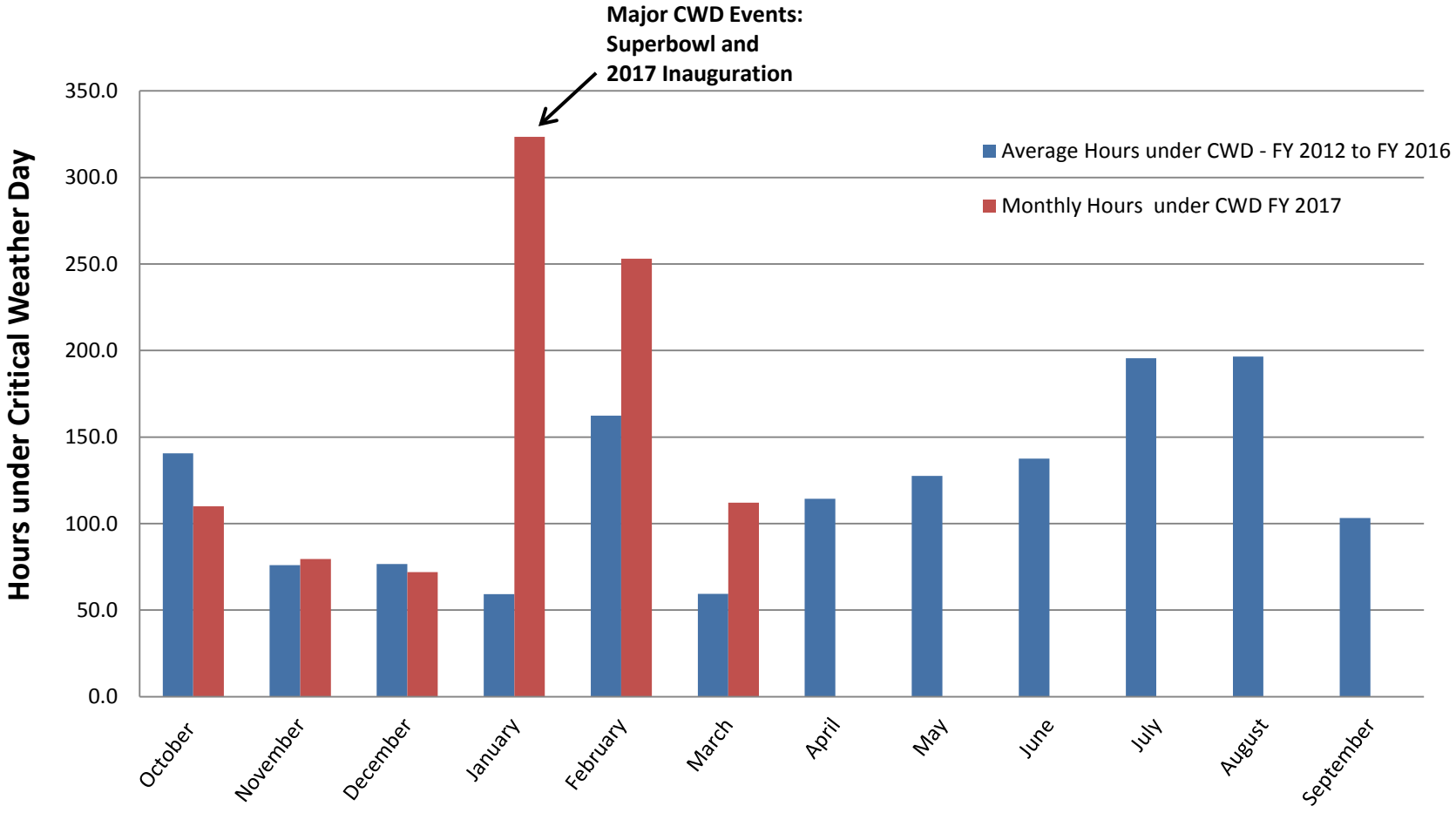
Architecture/Polar Operations



NDE → PDA Transition

- On March 8, 2017 PDA became the primary operational distribution system of SNPP data to ESPC users
- Challenges during/after transition
  - It took 3 SNPP contacts to get the 557th fully established and an additional day to set up required subscriptions for DoD, including B1.2 IPs → B2.0 EDRs
  - JPSS implemented a calibration algorithm change to improve the quality of the ATMS TDR/SDR coincident with the Block 2 Transition to Operations (TTO), which several users were not prepared to handle
    - NWS is now assimilating ATMS into the models
  - IDPS VIIRS Moderate products and NDE downstream NUCAPS, VPW, VHP products are impacted due to incorrect S-NPP VIIRS Cloud Mask over the Southern Hemisphere. Significant areas of the Southern Hemisphere, especially Antarctica, are incorrectly labeled as "snow/ice free. Developers are working to implement a fix (tentatively scheduled to be operational on April 10th)
  - Worked on characterizing slowness issues for several users, including NCEP super computers.
    - Added another utils server instance to PDA that greatly increased through-put

Critical Weather Day Impacts FY-2017 vs Average



Upcoming COOP/Backup Activities

- ESPC Wallops CIP Activation and MPLS Failover Event - week of 27 March
  - Some "Ancillary Data" for GOES-R and JPSS will not be available (IMS and ASI/GMASI) during the failover
- GOES COOP - week of 27 March
  - complete outage of GOES-16 data via PDA starting on 28 March 2017 for 26 hours
- SNPP COOP Exercise – 24-28 July 2017
  - SNPP data via PDA from CBU instead of NSOF