Enabling Information Sharing thru Common Services

The NET: Development/ Management of Interagency Testbed

Presented To: ATIEC Conference

Presenter: Peter Pickard, NOAA

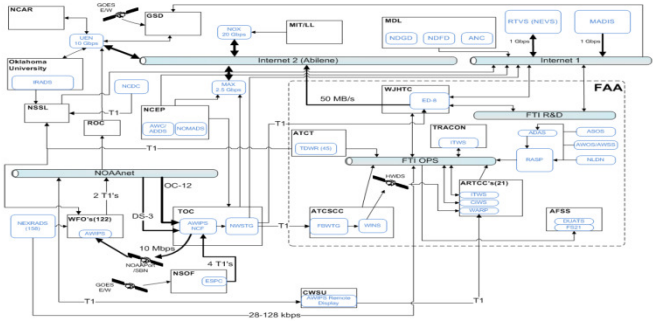
Date: September 1, 2011

DISCLAIMER:

Mistakes in this presentation are my fault!

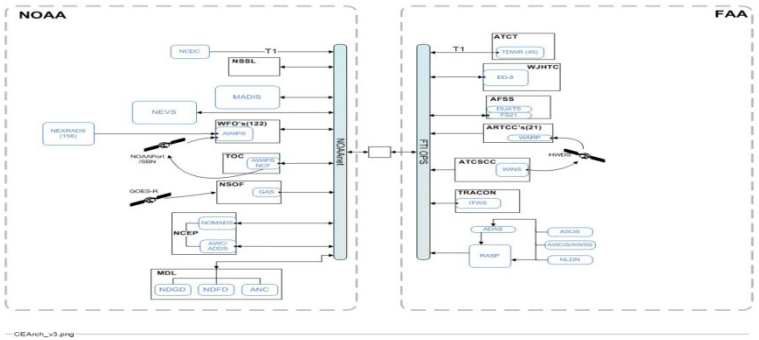
NET Testbed

How do we get from this:



- Not readily expandable
- Expensive with needless complexity
- Multiple and incompatible data formats

To this:



- Improved Efficiency
- Consolidation of data lines
- Reduced operating costs
- OGC data format

Current Reality

- This presentation shows how the testbed is configured today and a little how it got that way
- As a result of the CR and other financial pressures, the scope and direction of the NET has changed significantly in the past 6 months
- The NET will remain
  - Its oversight will change, including the users and data providers
  - It will continue to evolve to meet overarching test and evaluation needs
- It is supported by FAA and NOAA funds

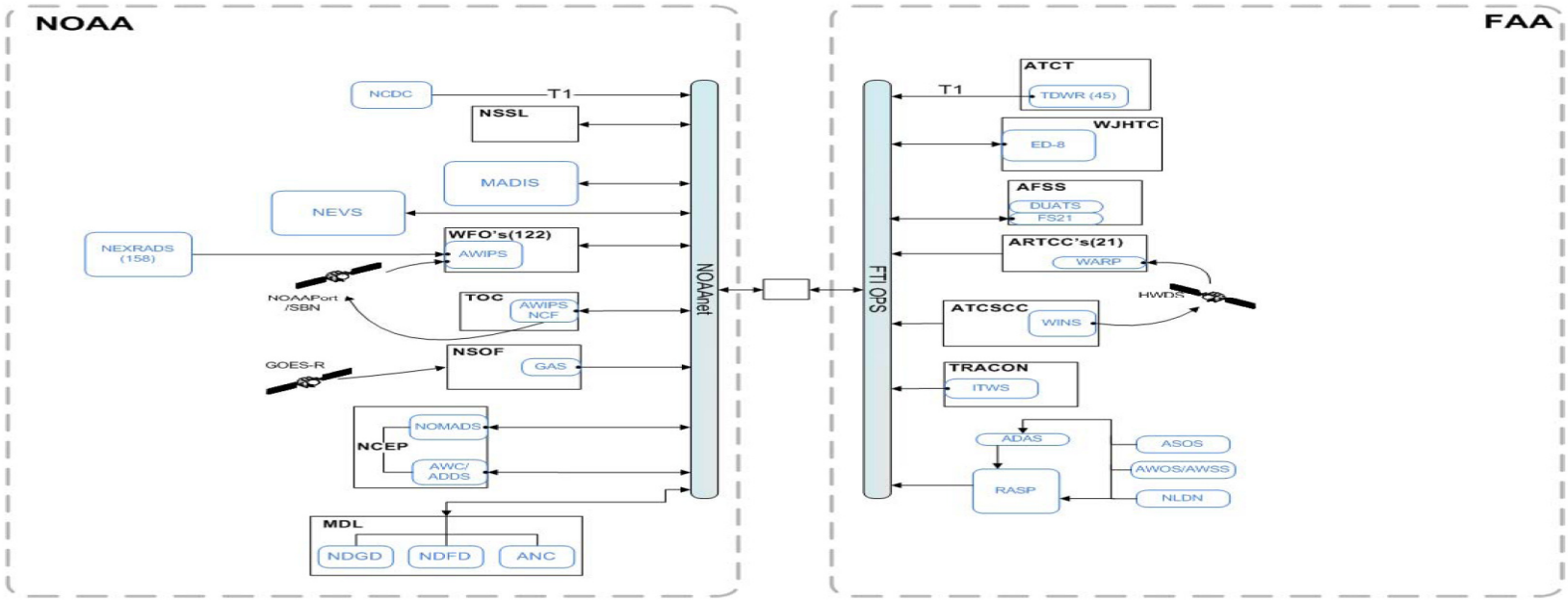
The Road to Testing

- **From September, 2010 several test and evaluation activities have occurred, each building on the last**
  - **Capability Evaluation, September, 2010**
  - **CE follow-up, March, 2011**
  - **Performance and security evaluations, April, June, 2011**
  - **Construction of a full multi-tiered NNEW test architecture for the 2011 CE**
  - **Stand-up of the NETE**

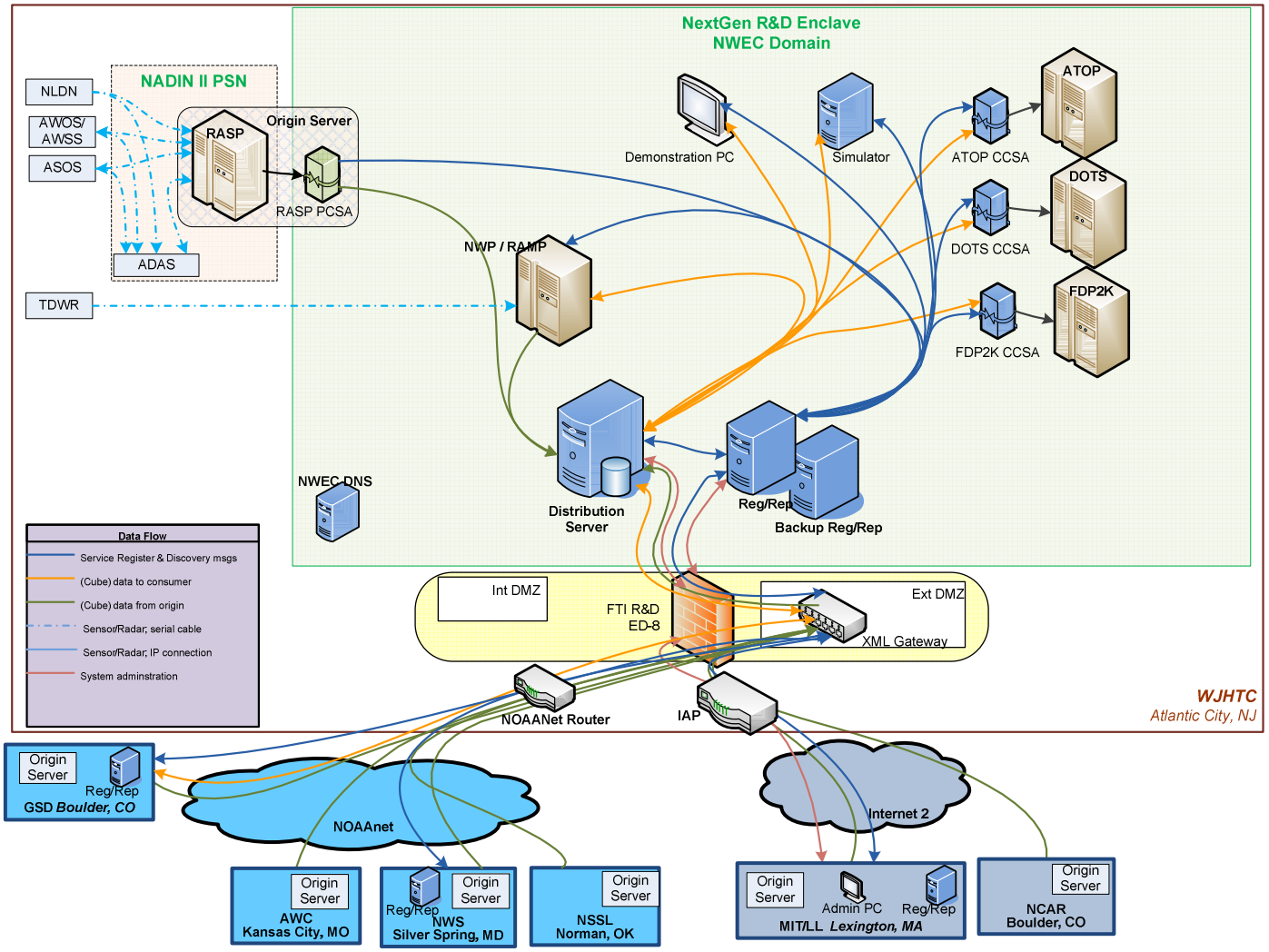
September, 2010 CE

- The NextGen Capability Evaluations (CE) are a cooperative effort between FAA and NOAA, and depend on their “brain trust” organizations for technical support – OAR, LL, NCAR – as well as a growing cadre of data providers
- Since 2009, the event is annual to show progress in weather dissemination to the FAA and as risk reduction
- NOAA and FAA cooperate in bringing state of the atmosphere information from legacy NOAA systems into FAA NNEW
- This is performed by identifying NOAA weather products the FAA requires for their NNEW system
- Then, convert these legacy products into a ‘net-ready’ format, OCG/WXXM formats, make them available from one location, and convey to the FAA

2010 CE Target Configuration



2010 CE


NextGen R&D Enclave
NWEC Domain
NADIN II PSN
NLDN
AWOS/ AWSS
ASOS
ADAS
TDWR
RASP
Origin Server
RASP PCSA
NWP / RAMP
Demonstration PC
Simulator
ATOP
ATOP CCSA
DOTS
DOTS CCSA
FDP2K
FDP2K CCSA
NWEC DNS
Distribution Server
Reg/Rep
Backup Reg/Rep
Data Flow
Service Register & Discovery msgs
(Cube) data to consumer
(Cube) data from origin
Sensor/Radar, serial cable
Sensor/Radar, IP connection
System adminstration
Int DMZ
FTI R&D ED-8
Ext DMZ
XML Gateway
NOAANet Router
IAP
WJHTC
Atlantic City, NJ
Origin Server
Reg/Rep
GSD Boulder, CO
NOAAnet
Internet 2
AWC Kansas City, MO
NWS Silver Spring, MD
NSSL Norman, OK
Admin PC
MIT/LL Lexington, MA
NCAR Boulder, CO

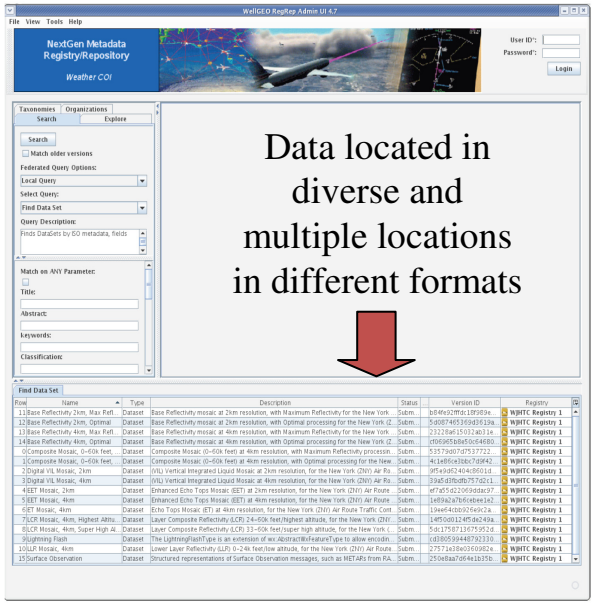
2010 CE Summary

- Over 300 products generated and made available
- Over 10 national locations generated products directly to the FAA Tech Center
- Delivered to a one-point source and available on-demand, when needed and available
- All products 'net-ready', OGC Compliant and provided on internet-type data lines
- Early NET platform served as a risk reduction tool with promise for future

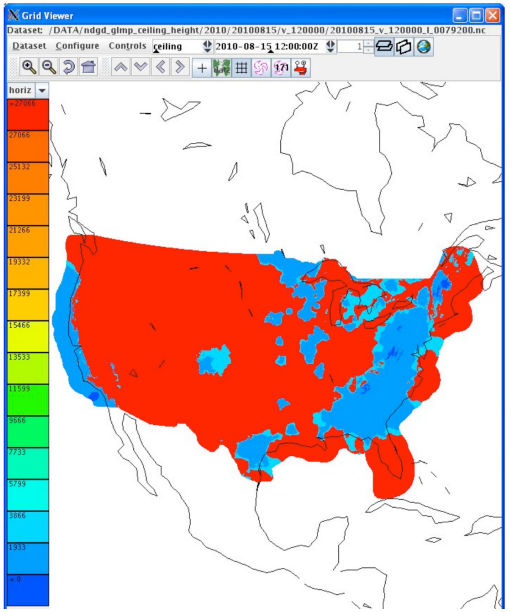
Proof of Concept Realized

- Demonstrated 'federated' legacy NOAA and FAA systems so both systems appear as a single system with complete access
- Converted legacy data into net-ready format (GRIB-X data into NetCDF-X format
- Exercised WCS and WFS Reference Implementations
- Identified at a single point (registry), available through a single location (repository)
- Display at the FAA William J. Hughes Technical Center, Atlantic City, NJ

Proof of Concept – con't.



Converts to Net-Ready Format and sends to FAA like this

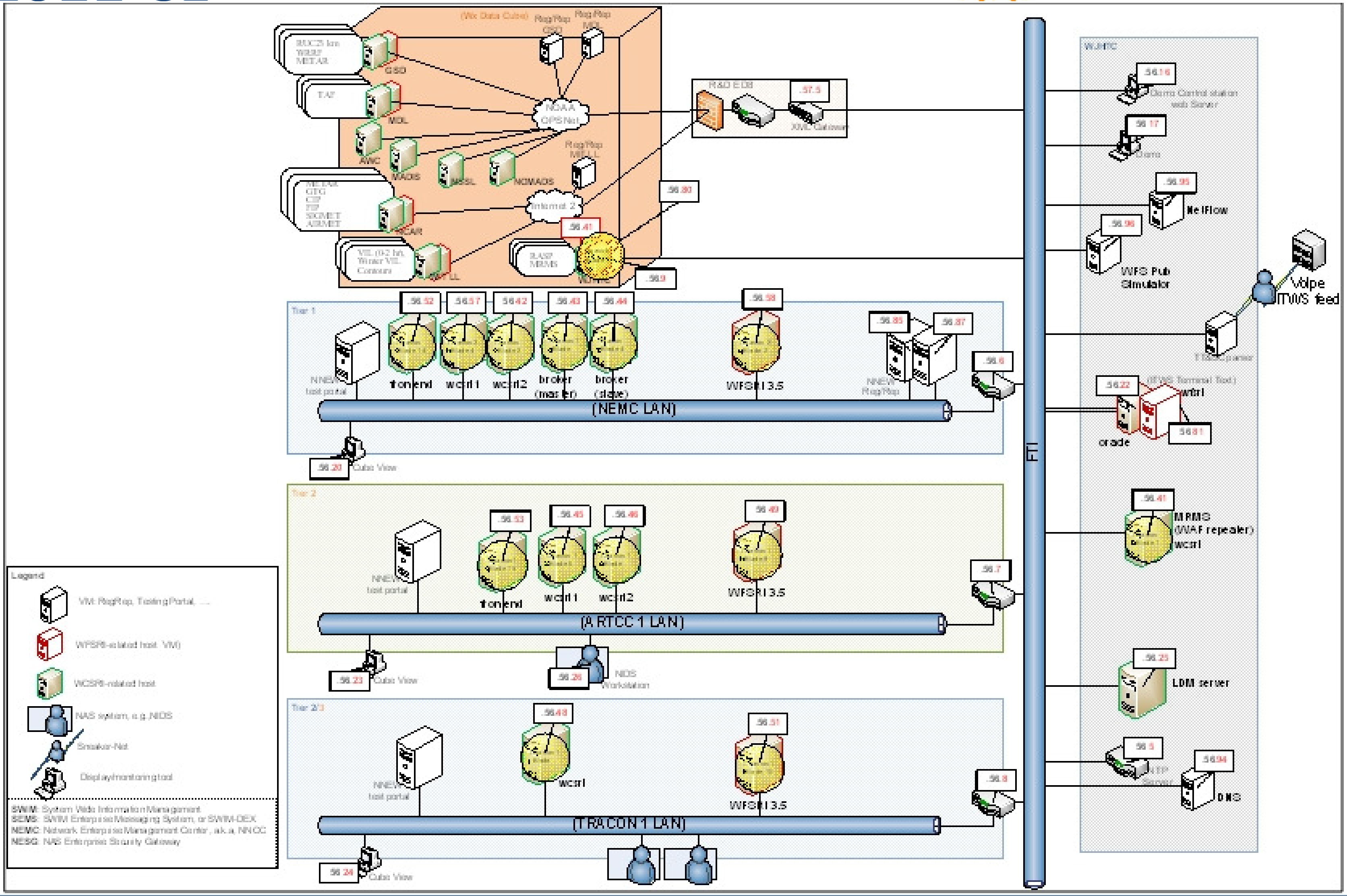


Enhanced NET

- Completed first test in March 2011. This was a verification of skill sets and testing of system
- Performed latency test in Apr 2011 examining automated subscription to the FAA
- Performed throughput tests in June, 2011
- Security testing between NOAA and FAA XML gateway devices showed compatibility among different vendors

2011 CE

Air Transportation Information Exchange Conference - (featuring AIXM, WXXM and FIXM)



2011 CE Purpose

- Demonstrate NNEW benefits
- Demonstrate NNEW capabilities
- Demonstrate NNEW performance
- Demonstrate Security
- Show collaboration between NWS and FAA

Benefit 1: Resource Efficiency

- Scenario 1: Demonstrate performance measurement capabilities
- Scenario 2: Demonstrate Stress Test on WCS:
  - With clustering
  - Without clustering
- Scenario 3: Bandwidth Reduction Strategies

Benefit 2: Ease of Use

- Scenario 1: Interface NIDS at WJHTC to NNEW services
  - NIDS to consume ITWS data and MRMS 3D Radar mosaic
- Scenario 2: NIDS to consume NNEW data (METAR) with no impact as METAR metadata change or update
- Scenario 3: Demonstrate TFMS access to NNEW via screenshots

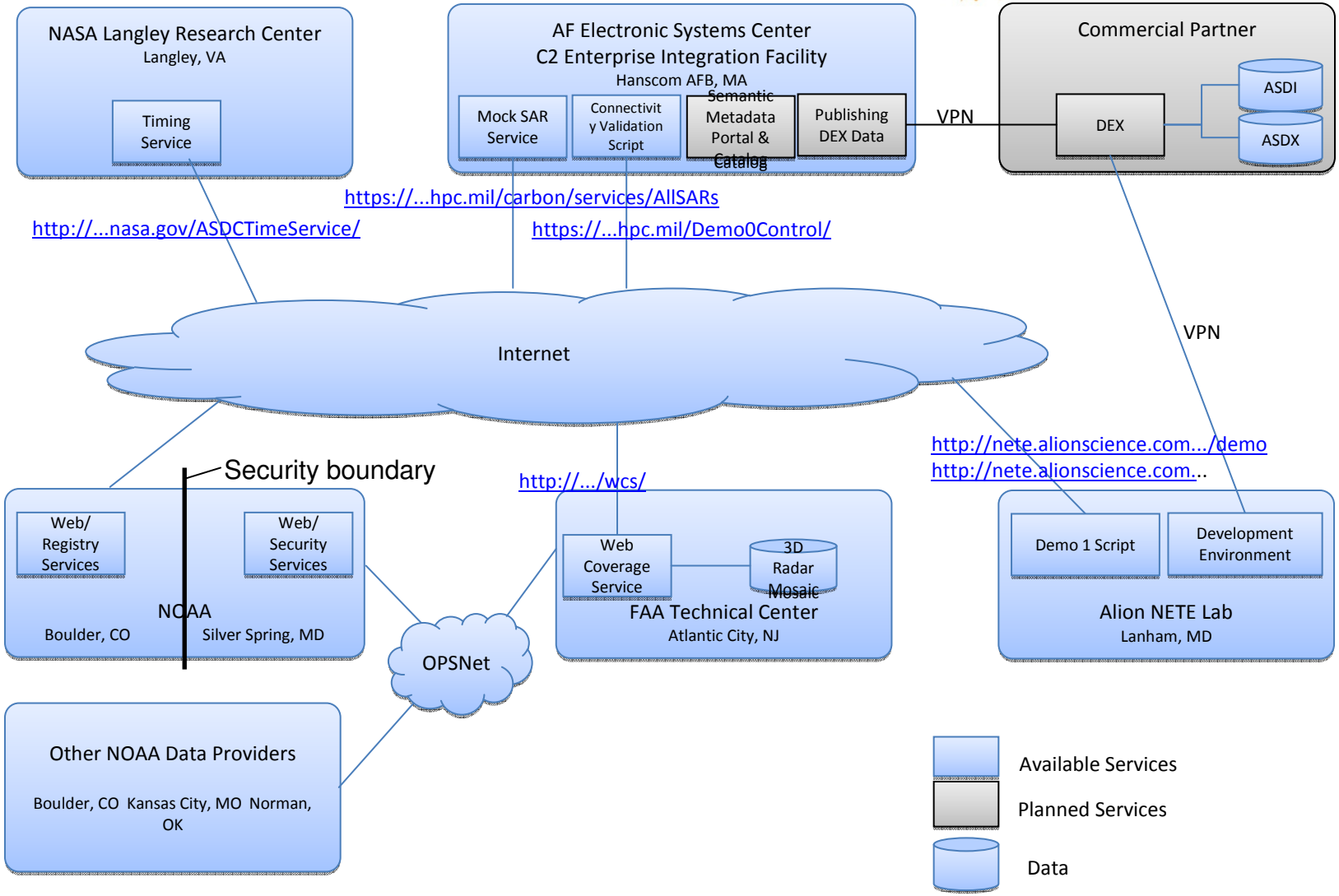
Benefit 3: Availability

- Scenario 1: Demonstrate NIDS retrieval of data from new source in the event of outage
- Scenario 2: Demonstrate agility with DS outage

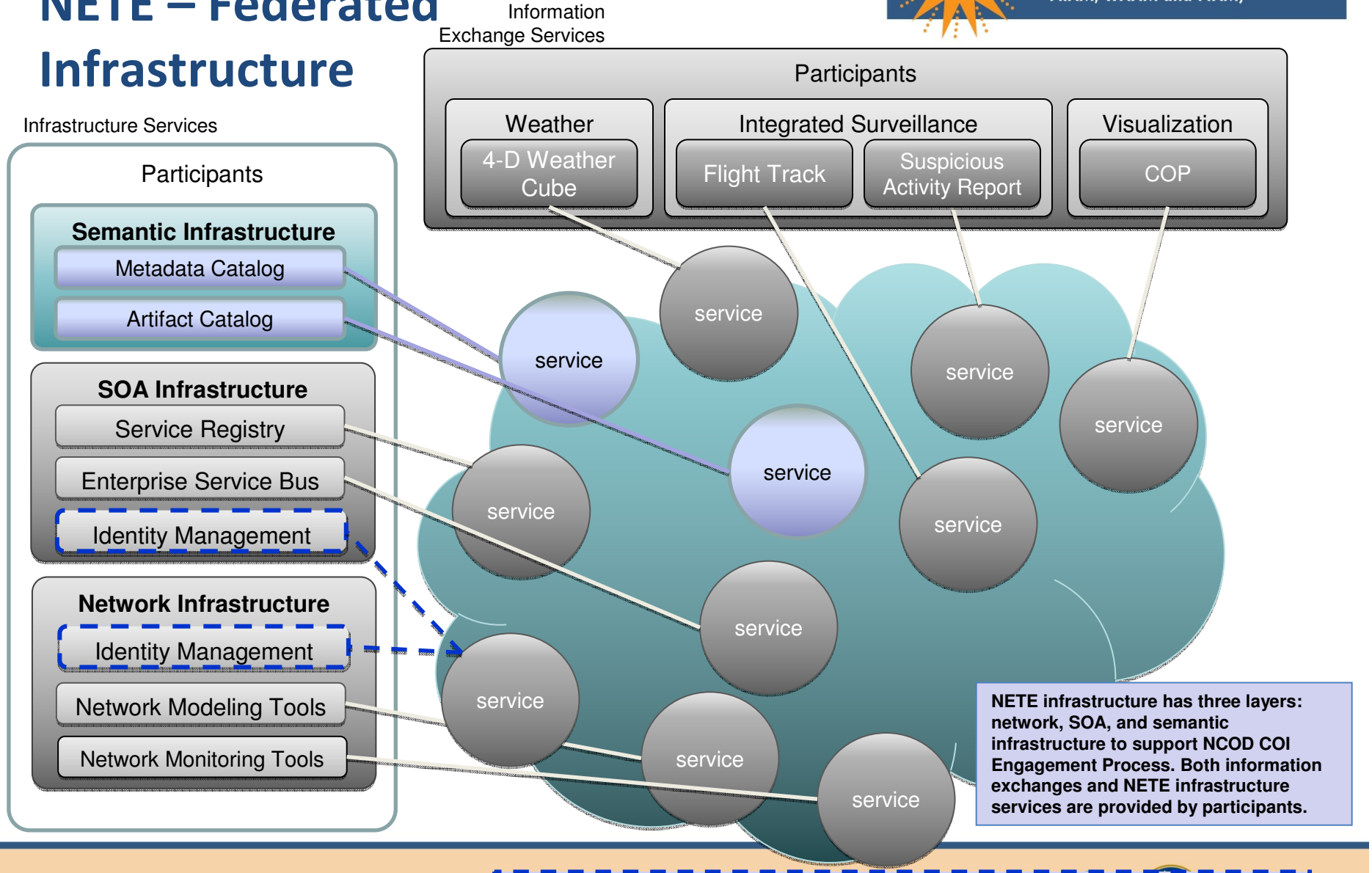
Benefit 4: Flexibility

- Scenario 1: Use CubeView (NCAR) to access NNEW data
- Scenario 2: Use Flight Weather Hazard Tool (NCAR) to access NNEW data
- Scenario 3: Use LucyView (MIT/LL) to access data
- Scenario 4: Display NNEW data on Google Earth
- Scenario 5: Display NNEW data using mobile displays (iPad, laptop, etc)
- Scenario 6: Use of Android tablet to access Reg/Rep
- Scenario 7: Use NNEW Testing Portal (GSD) to access NNEW data
- Scenario 8: Use COTS software (SoapUI) to access NNEW data

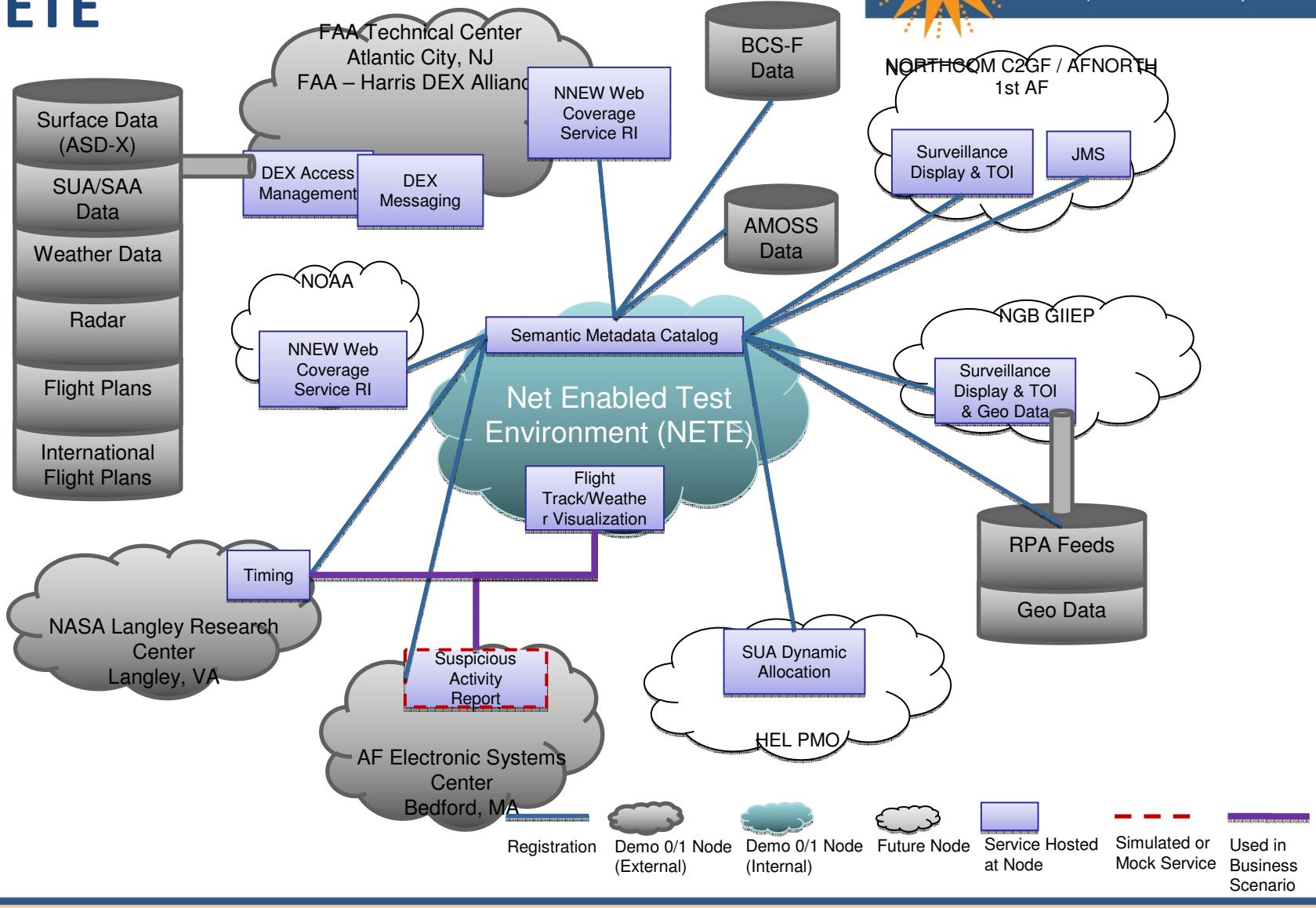
Current NETE



NETE – Federated Infrastructure



NETE


FAA Technical Center
Atlantic City, NJ
FAA – Harris DEX Alliance
NNEW Web Coverage Service RI
BCS-F Data
NORTHCOM C2GF / AFNORTH 1st AF
Surveillance Display & TOI
JMS
Surface Data (ASD-X)
SUA/SAA Data
Weather Data
Radar
Flight Plans
International Flight Plans
DEX Access Management
DEX Messaging
AMOSS Data
NOAA
NNEW Web Coverage Service RI
Semantic Metadata Catalog
Net Enabled Test Environment (NETE)
Flight Track/Weather Visualization
NGB GIIEP
Surveillance Display & TOI & Geo Data
RPA Feeds
Geo Data
Timing
NASA Langley Research Center
Langley, VA
Suspicious Activity Report
AF Electronic Systems Center
Bedford, MA
SUA Dynamic Allocation
HEL PMO
Registration
Demo 0/1 Node (External)
Demo 0/1 Node (Internal)
Future Node
Service Hosted at Node
Simulated or Mock Service
Used in Business Scenario

What Next?

- **We will continue the efforts begun before the CEs started**
- **We will continue to demonstrate horizontal and vertical expansion capability**
- **We will continue to adapt to financial pressures**
- **We will continue to explore opportunities to leverage and reuse existing capabilities we already own and operate**
- **We will continue to accept new participants – SESAR!**

Acronyms

ADAS AWOS Data Acquisition System
ARTCC Air Route Traffic Control Center
ASOS Automated Surface Observing System
AWOS Automated Weather Observing System
EbXML/EbRIM Electronic business XML and Registry information model
GML Geographic Markup Language
GRIB1 and GRIB2 Gridded Binary
ITWS Integrated Terminal Weather System
METAR Meteorological Aviation Report
MRMS Multiple-Radar / Multiple-Sensor
NADIN National Airspace Data Interchange Network
NET NextGen Environment for Testing
NETCDF-4 Network Common Data Form 4
NIDS NEXRAD Information Distribution Service
NLDN National Lightning Detection Network
NNEW NextGen Network-Enabled Weather
NWEC NextGen Weather Evaluation Capabilities
TDWR Terminal Doppler Weather Radar
TFMS Traffic Flow Management System
TRACON Terminal Radar Approach Control Facility
WCS, WFC Web Coverage and Feature services

Acknowledgements

- FAA Tech Center
- GSD
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- Alion
- MDL
- Providers, implementers, testers

(remember the disclaimer!)

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