

# NOAA/NESDIS/ESPC

## Where Is It Going and What Can I Expect?

### 2015 AMS Annual Meeting

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# Agenda

- ▶ ESPDS – The Future ESPC
  - Introduction
  - Architecture
- ▶ ESPDS Enterprise Capabilities
  - PDA
  - NDE 2.0
  - HRIT/EMWIN
- ▶ ESPDS Evolution
- ▶ ESPDS Benefits

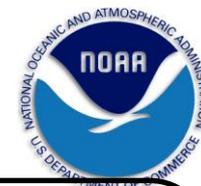
# ESPDS – The Future ESPC

# What is ESPDS?



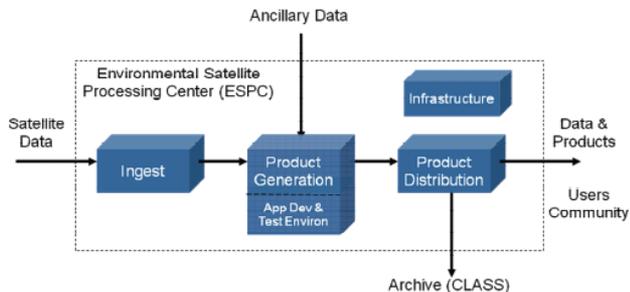
- ▶ Environmental Satellite Processing and Distribution System
  - Developed by the NESDIS Office of Systems Development (OSD), with Solers as the development contractor
  - Will be operated by the NESDIS Office of Satellite and Product Operations (OSPO)
- ▶ Modernizes the NESDIS Environmental Satellite Processing Center (ESPC)
  - Single enterprise solution that meets the needs of existing (legacy), GOES-R, S-NPP/JPSS, and GCOM-W, **with scalability to meet future environmental satellite needs**
    - **No more stovepipes!**
  - Includes modernization of the Product Generation (PG), Product Distribution (PD), and Infrastructure segments of the ESPC (with Ingest as a potential future modernization)
  - Provides environmental satellite data and services to a growing user community including:
    - NOAA Line Offices (NWS, NMFS, NOS, NIC, NESDIS, etc.)
    - DoD (AFWA, NAVO, etc.)
    - Other U.S. and international users (government, universities, foreign partners, etc.)
- ▶ Will be implemented at the primary and backup ESPC sites:
  - Primary ESPC site is the NOAA Satellite Operations Facility (NSOF) in Suitland, MD
  - Future ESPC backup site is the Consolidated Back Up (CBU) facility in Fairmont, WV
- ▶ Provides a **scalable and secure infrastructure** as a foundational building block upon which all other system functions and services reside

# ESPDS Modernizes NESDIS' Product Processing and Distribution



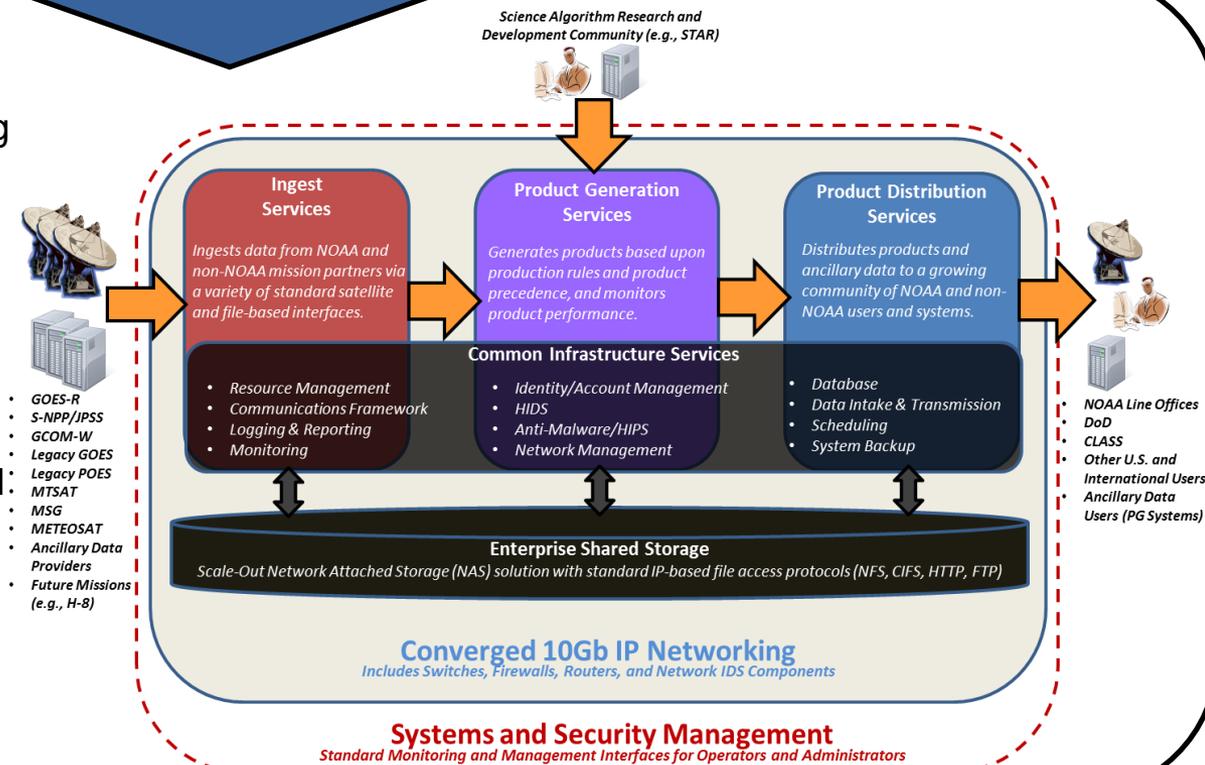
## Current Legacy Model:

- Each satellite mission provides its own stove-piped set of product processing systems
- Each processing system contains its own stove-piped infrastructure and applications, creating redundancy and duplication of the same data and capabilities as other processing systems
- Redundancy and duplication increase costs and complexity, making it unaffordable to maintain



## ESPDS Enterprise Model:

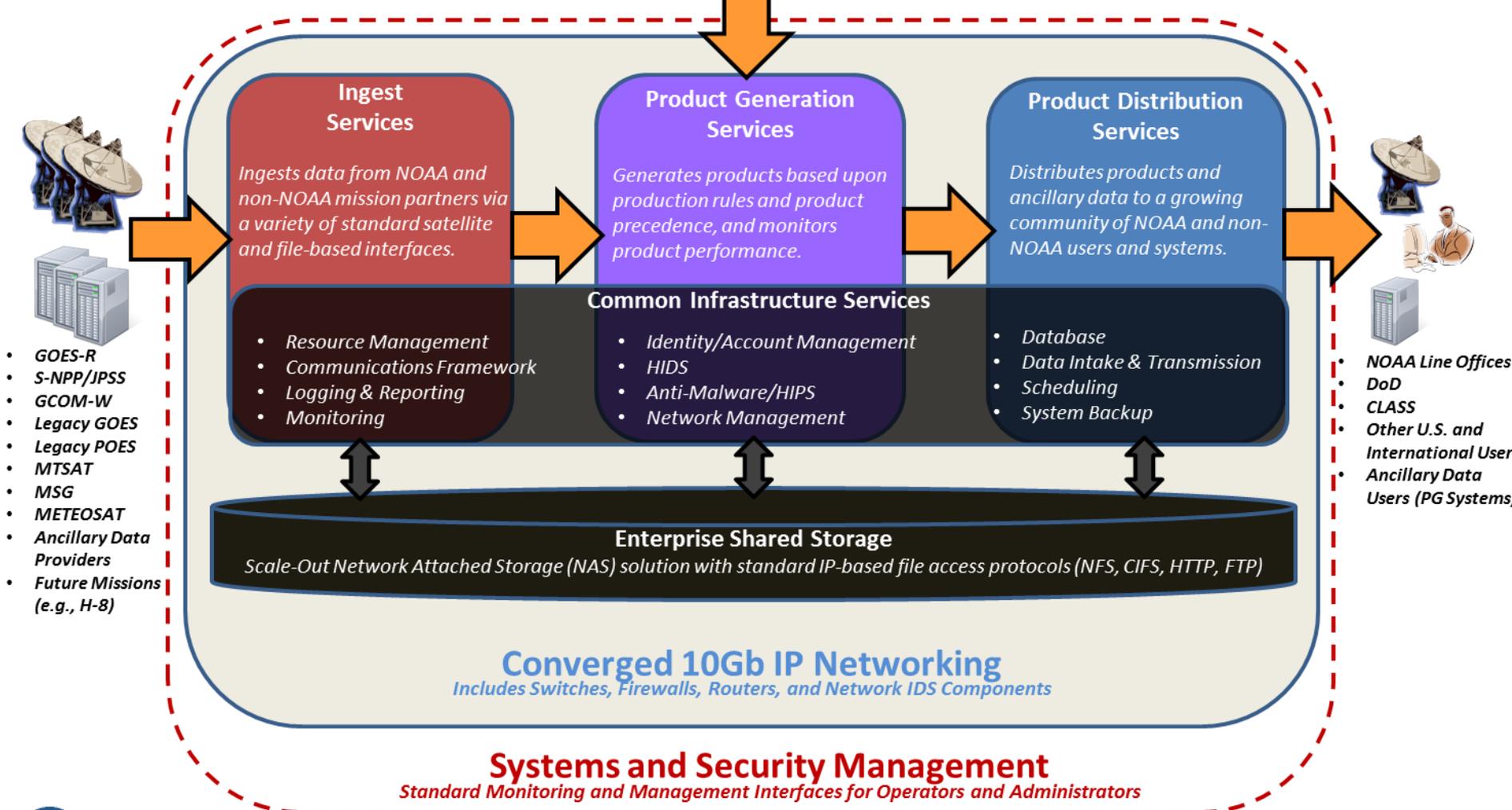
- NESDIS satellite missions leverage common infrastructure and processing services, **reducing redundancy and costs**
- Enterprise User Portal provides **user self-service** subscription and search capabilities **across all NESDIS products**
- Common Infrastructure Services reduce redundant, recurring costs and **simplify operations, maintenance, monitoring, and security**
- Enterprise Shared Storage reduces transfers of data, **reducing resource requirements and improving reliability**



# ESPDS Enterprise Architecture



Science Algorithm Research and Development Community (e.g., STAR)



- GOES-R
- S-NPP/JPSS
- GCOM-W
- Legacy GOES
- Legacy POES
- MTSAT
- MSG
- METEOSAT
- Ancillary Data Providers
- Future Missions (e.g., H-8)

**Ingest Services**  
*Ingests data from NOAA and non-NOAA mission partners via a variety of standard satellite and file-based interfaces.*

**Product Generation Services**  
*Generates products based upon production rules and product precedence, and monitors product performance.*

**Product Distribution Services**  
*Distributes products and ancillary data to a growing community of NOAA and non-NOAA users and systems.*

- Common Infrastructure Services**
- Resource Management
  - Communications Framework
  - Logging & Reporting
  - Monitoring
  - Identity/Account Management
  - HIDS
  - Anti-Malware/HIPS
  - Network Management
  - Database
  - Data Intake & Transmission
  - Scheduling
  - System Backup

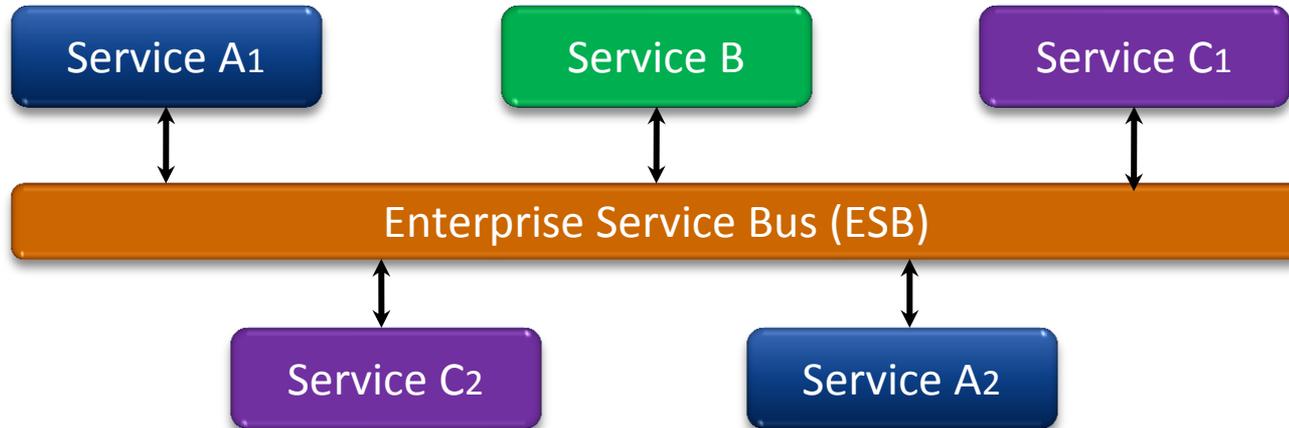
**Enterprise Shared Storage**  
*Scale-Out Network Attached Storage (NAS) solution with standard IP-based file access protocols (NFS, CIFS, HTTP, FTP)*

**Converged 10Gb IP Networking**  
*Includes Switches, Firewalls, Routers, and Network IDS Components*

**Systems and Security Management**  
*Standard Monitoring and Management Interfaces for Operators and Administrators*

- NOAA Line Offices
- DoD
- CLASS
- Other U.S. and International Users
- Ancillary Data Users (PG Systems)

# ESPDS is Built Upon a SOA



- ▶ ESPDS uses a Service-Oriented Architecture (SOA)
- ▶ Using a SOA provides the following benefits:
  - **Extensibility:** The loose coupling of services allows the ability to *add new functionality* to the system *without impacting the existing capabilities*
  - **Reusability:** ESPDS services will be *usable for future integration*, benefitting future government systems
  - **Modularity:** ESPDS services are able to be *upgraded and replaced easily*
  - **Cost:** All of the above enable *long term cost benefits*

# ESPDS Virtualized Computing Stack



*The ESPDS Common Infrastructure Platform provides a virtualized computing stack that enables dynamic resource management (automated scale-up and scale-down) of services deployed within Virtual Machines (VMs)*

Resource Manager  
(Monitor/Manage VMs, Scale Up/Down VM Instances)

Service-Specific Software

ESPDS Common OS Image

VM Instance - 1

Service-Specific Software

ESPDS Common OS Image

VM Instance - 2

...

Service-Specific Software

ESPDS Common OS Image

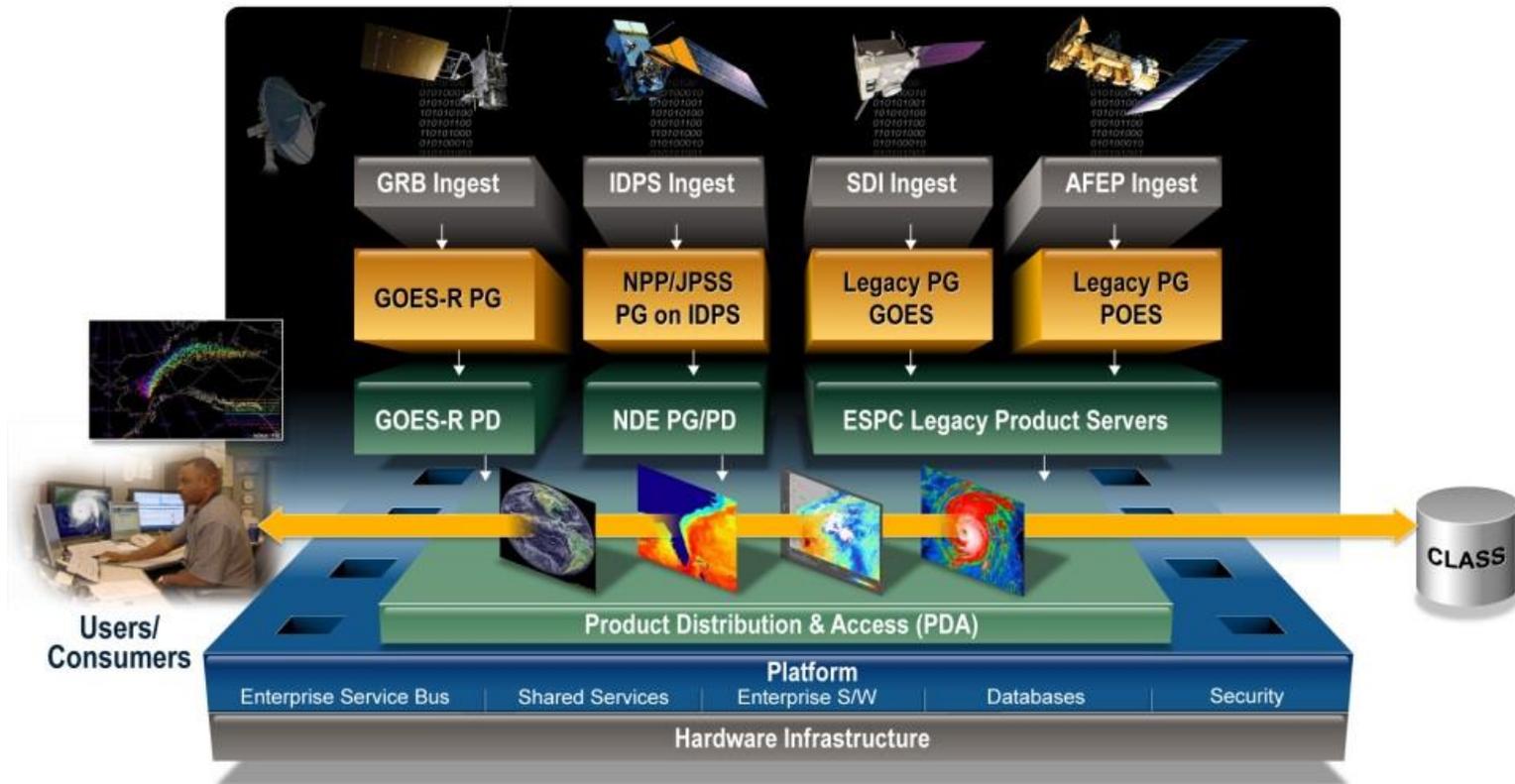
VM Instance - N

Virtualization Hypervisor Layer

Physical Computing Hardware Cluster

# ESPDS Enterprise Capabilities

# Product Distribution and Access (PDA)



- ▶ PDA is the first Enterprise Capability (collection of services) being deployed to the ESPDS Common Infrastructure Platform
- ▶ Next Generation Missions (GOES-R and JPSS) are the catalyst for this modernized Product Distribution capability that:
  - Supports the enormous increase in data volumes while continuing support for legacy interfaces
  - **Streamlines data flow by centralizing distribution (Enterprise PD capability)**
  - Is **extensible** to future interfaces and missions, and **scalable** to accommodate future data volumes without redesign
  - Monitored and measured using ESPDS Common Infrastructure Management tools
  - Provides **User Self-Service** for access to NESDIS data and products, **enabling users to acquire just the data they need**

# PDA User Portal

## Self-Service Subscription Management



**PDA USER PORTAL**

Account ▾ Subscription ▾ Search ▾ Ad-Hoc ▾
consumer1 ▾

### Manage Subscriptions > Edit

*General Parameters*

Start Date	*2012-06-21	Stop Date	[ ]	<input type="checkbox"/> Active
<small>Leave Stop Date/Time blank for Ongoing subscription</small>				
Save as	*AA	to Group	*SubGroupC	<b>New Sub Group</b>
Approval	PENDING	Approval Reason	because i canUser does not I	<input checked="" type="checkbox"/> Active At Primary Site
				<input checked="" type="checkbox"/> Active At Backup Site

*Product Details*

Satellite	Select	Instr Channel	Select Inst 1st	Datatype	Atmosphere
Instrument	Select Sat 1st	Instr Mode	Select Inst 1st	Format	NetCDF4
Product	*ABI-L2-ACTPF				
No Older Than	[ ]	minutes	Asc/Desc	<input type="radio"/> NA <input type="radio"/> Both <input checked="" type="radio"/> Asc <input type="radio"/> Desc	Day/Night
				<input type="radio"/> NA <input checked="" type="radio"/> Both <input type="radio"/> Day <input type="radio"/> Night	<b>Reset Product Fields</b>

*Delivery*

Delivery Trigger	*ARRIVAL
Every (minutes)	[ ]
Delivery Delay	[ ]
Notification	*NONE
Notif Email	[ ]
Checksum	*NONE

*Delivery Destination\**

<input type="checkbox"/> Name	destDir	destUrl	destType
<input type="checkbox"/> PublicZonePull			PULL
<input type="checkbox"/> PartnerZonePull			PULL
<input type="checkbox"/> ICEZonePull			PULL
<input type="checkbox"/> authUserRegress...	authUser/testDe...	pdafstp-prod-0	FTP
<input type="checkbox"/> authUserRegress...	authUser/testDe...	pdafstp-prod-0	FTP

*Renaming Options for Transfer Filename*

<input type="checkbox"/> Replace up to 64 characters of original filename	Add Prefix	[ ]	Transform to	<input checked="" type="radio"/> None <input type="radio"/> All Uppercase
From	Add Suffix	[ ]	<input type="radio"/> All Lowercase	
To				

*Renaming Options for Post Transfer Filename*

<input type="checkbox"/> Replace up to 64 characters of original filename	Add Prefix	[ ]	Transform to	<input checked="" type="radio"/> None <input type="radio"/> All Uppercase
From	Add Suffix	[ ]	<input type="radio"/> All Lowercase	
To				

Cancel Save

# PDA User Portal

## Region of Interest (ROI) and Tailoring Per-Subscription

*ROI and Tailoring*

ROI:

ROI Matching:  None  Overlaps  Exists Within

Sectorize on selected ROI

Bit-Depth Scale:

Spatial Resolution:

Add WMO Header

Convert to:

Remap to:

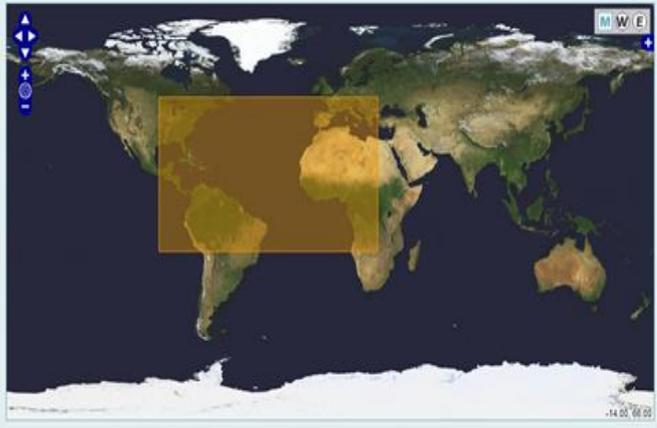
Custom Params:

*Product Layer*

<input type="checkbox"/>	Name	Unit	Description

Manage ROIs > New ROI

Hold **Shift** key to draw ROI: they will be matched only to that image (i.e. ROI on "East" will only match GOES-East products). Alternatively, enter in pixel or lat/lon values.



Region of Interest

Mercator

Extents units:  LatLon  Pixels

North Extents:

East Extents:

South Extents:

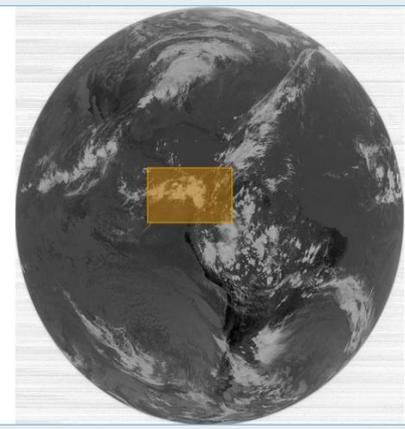
West Extents:

ROI Name:

Mercator ROI Example

Manage ROIs > Edit ROI

Hold **Shift** key to draw ROI: they will be matched only to that image (i.e. ROI on "East" will only match GOES-East products). Alternatively, enter in pixel or lat/lon values.



Region of Interest

GOES-East

Extents units:  LatLon  Pixels

North Extents:

East Extents:

South Extents:

West Extents:

ROI Name:

GOES-East ROI Example

# PDA User Portal

## Search the Product Inventory



**Manage Searches > Edit**

---

**Start/Stop Time**

Start Time: \* 2014-10-14 00:00

End Time: \* 2014-10-28 00:30

---

**General Attributes**

Name: \* 1014EJPAIL      ROI: badS0withoutEXT      ASC/DESC: ASCENDING

Orbit number: 3      ROI Match: OVERLAPS      Day/Night: DAY

User Group: \* SysAdminGroup

---

**Product**

TEST\_regressCompressedFTPpush

TEST\_regressEncryptedFTPSPull

TEST\_regressTableMetadataExtractionExtants

TEST\_NetCDFMetadataExtraction

TEST\_PythonMetadataExtraction

TEST\_regressPUBLFTPpull

TEST\_regressICEFTPpull

TEST\_regressPartFTPpull

TEST\_regressPUBLFTPpush

TEST\_regressICEFTPpush

TEST\_regressPartFTPpush

Test\_Regexp\_matching\_push

ABI-L2-RSRF

TEST\_regressCRC32FTPpush

ABI-L2-CMIPC

MSN-ACQ

TEST\_regressMD5FTPpush

MHSx-CAL

TEST\_regressAsyncFTPpush

TEST\_regressSHA512SFTPpush

TEST\_regressSFTPKeyPush

ABI-L2-TPWC

QF Name	Type	Min Value	Max Value
percent_conditionally...	PERCENT	0.0	100.0
percent_pixels_with_...	PERCENT	0.0	100.0
percent_degraded_d_...	PERCENT	0.0	100.0
percent_pixels_with_...	PERCENT	0.0	100.0
percent_invalid_due_...	PERCENT	0.0	100.0

QF Name	Sel Min Val	Sel Max Val
percent_pixels_with_...	5.0	80.0
percent_pixels_with_...	5.0	80.0

---

**Filters**

**Satellite**

Name	Alias
<input checked="" type="checkbox"/> G15	
<input type="checkbox"/> GPS-Met	
<input checked="" type="checkbox"/> IS-9	
<input checked="" type="checkbox"/> J2	
<input checked="" type="checkbox"/> KP1	

**Instrument**

Name	Alias
<input type="checkbox"/> SSM/I-F14	
<input checked="" type="checkbox"/> SSM/I-F15	
<input checked="" type="checkbox"/> SSM/T2-F14	
<input checked="" type="checkbox"/> SSM/T2-F15	
<input checked="" type="checkbox"/> SSM/T2-F16	

**Instrument Mode**

Name	Instrument Na...
<input checked="" type="checkbox"/> 3	ABI
<input checked="" type="checkbox"/> 4	ABI
<input checked="" type="checkbox"/> 2	ABI
<input checked="" type="checkbox"/> 1	ABI
<input type="checkbox"/> TestInstrument...	TestInstrument10...

**Channel**

Name	Instrument Na...
<input checked="" type="checkbox"/> 01	ABI
<input checked="" type="checkbox"/> 02	ABI
<input checked="" type="checkbox"/> 03	ABI
<input checked="" type="checkbox"/> 04	ABI
<input type="checkbox"/> 05	ABI

**Date Type**

Name
<input type="checkbox"/> Spectral/Engineering
<input checked="" type="checkbox"/> Oceans
<input checked="" type="checkbox"/> Atmosphere
<input checked="" type="checkbox"/> Ancillary
<input checked="" type="checkbox"/> Test

**Data Format**

Name
<input type="checkbox"/> NetCDF4
<input checked="" type="checkbox"/> FITS
<input checked="" type="checkbox"/> AREA
<input checked="" type="checkbox"/> BUFFER
<input checked="" type="checkbox"/> HDF

# PDA User Portal

## Ad-Hoc Requests for Products from Search Results

**PDA USER PORTAL**

Account ▾ Subscription ▾ Search ▾ Ad-Hoc ▾
consumer1 ▾

**Manage Ad-Hoc Requests > New Request**

**Search Results**

Search

File Name
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014061180453_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014061180226_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014061180042_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014061180459_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014061175834_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014061174820_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014061174752_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014061175010_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014061174710_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014061174328_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014061174634_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014061174324_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014061174021_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014059213634_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014059213618_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014059212504_e2016054000
<input type="checkbox"/> IS_ABI-L1b-SOFM-M3C08_G16_s2014059212334_e2016054000

Drag/drop to Request List OR select multiple and add them

**Items to Request**

<input type="checkbox"/>	File Name
<input checked="" type="checkbox"/>	IS_ABI-L1b-SOFM-M3C08_G16_s2014061180453_e2016054000
<input type="checkbox"/>	IS_ABI-L1b-SOFM-M3C08_G16_s2014061180226_e2016054000
<input type="checkbox"/>	IS_ABI-L1b-SOFM-M3C08_G16_s2014061180042_e2016054000
<input type="checkbox"/>	IS_ABI-L1b-SOFM-M3C08_G16_s2014061180459_e2016054000

Remove selected from List

Request Options

Selected Item TAILORING Options

Selected Item RENAME Options

Renaming Options for Transfer Filename

Replace up to 64 characters of original filename

<input type="text" value="ABI"/>	<input type="text" value="ABI2"/>
----------------------------------	-----------------------------------

Add Prefix

Add Suffix

Transform to  None  All Uppercase  All Lowercase

Renaming Options for Post Transfer Filename

Replace up to 64 characters of original filename

Add Prefix

Add Suffix

Transform  None  All Uppercase  All Lowercase

Apply

Submit
Cancel

# PDA Machine-to-Machine Interfaces

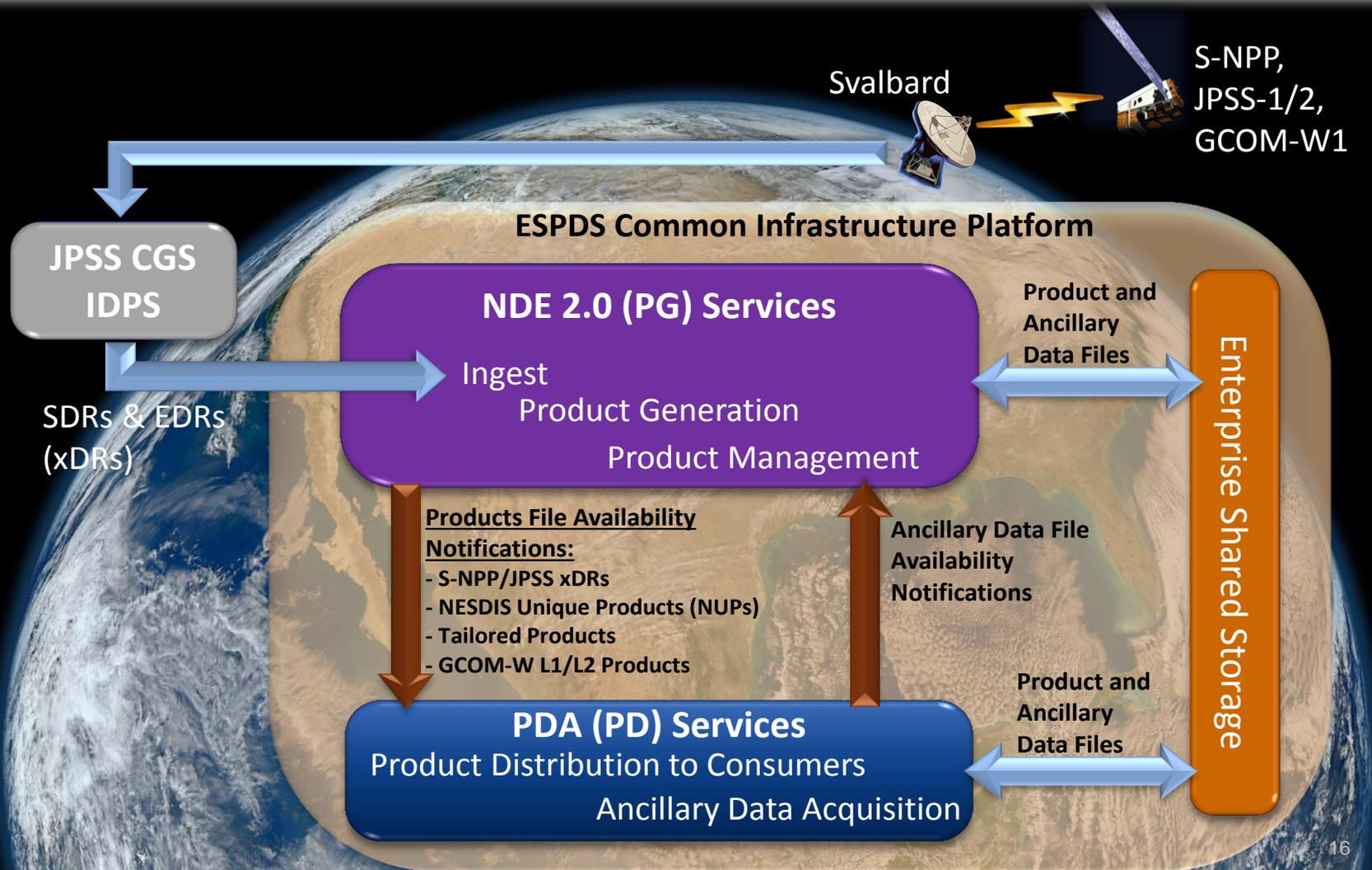
## ▶ Data Transfer and Access

- FTPS and SFTP file transfer interfaces for data providers and data consumers
- Trusted NESDIS systems approved by the ESPC ISSO (such as GOES-R and CLASS) as may also directly access directories and files on the ESPDS Network Attached Storage (NAS) cluster via its NFSv4 interface

## ▶ SOAP Web Services

- File Transfer Notification Web Service
  - For Data providers to notify PDA of files that were transferred to the ESPDS NAS
- File Transfer Failure Notification Web Service
  - For PDA to notify data providers of files that it failed to receive when compared to a manifest, or files that failed to pass an integrity check (e.g., SHA-384 hash)
- Data Discovery and Retrieval Web Services
  - Exposes search and ad-hoc request functionality via web services for data consumers
- OGC Web Services
  - Exposes OGC WMS, WCS, and Catalog web services for data consumers

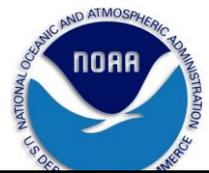
# S-NPP Data Exploitation (NDE) 2.0



# NDE Product Generation (PG)

- ▶ Facilitates research to operations for new/modified products
- ▶ Provides a PG framework implemented in a SOA
  - Data agnostic, can execute any algorithm (***“algorithm as a service” concept***)
  - Delivered Algorithm Package (DAP) provides a ***standard algorithm packaging specification*** for “plug-and-play” algorithm integration with NDE PG
  - Integrating GCOM-W L1/L2 algorithms in NDE 2.0
- ▶ ***Reuses PDA-provided services*** for product distribution to consumers, and ancillary data acquisition
- ▶ ***Hosted within the ESPDS common infrastructure platform*** (as of NDE 2.0)
- ▶ NDE 1.0 has been producing operational NUPs and Tailored Products from S-NPP with ***99.992% Operational Availability*** since August 2013
- ▶ Future solution for production of NUPs and Tailored Products from JPSS-1 and JPSS-2, and L1/L2 products from GCOM-W1

# NDE Science Algorithm Integration Process



## Science Algorithm Development

### STAR Enterprise Product Lifecycle (EPL)

- Preliminary Design Review
- Critical Design Review
- Test Readiness Review
- System (Algorithm) Readiness Review

### Delivered Algorithm Package (DAP)

- Algorithm Delivery Standards, Integration, and Test V1.4 (DAP Document)
- Configuration management of DAP

### Algorithm Enhancements/Updates

- Redeliver DAP

### product-IPT (p-IPT)

Monthly status meetings  
Product stakeholders  
Issue resolution

## NDE Science Algorithm Development and Integration Environment (SADIE)

### Algorithm Development/Test Sand Box

- NDE environment, operating system, compilers, science libraries

### DAP Integration into NDE

- Configuration management
  - Production rules
  - Unit testing

## NDE Test Environment

System and Performance Testing

*Satellite Products and Services Review Board (SPSRB) Approval*

## NDE Production Environment

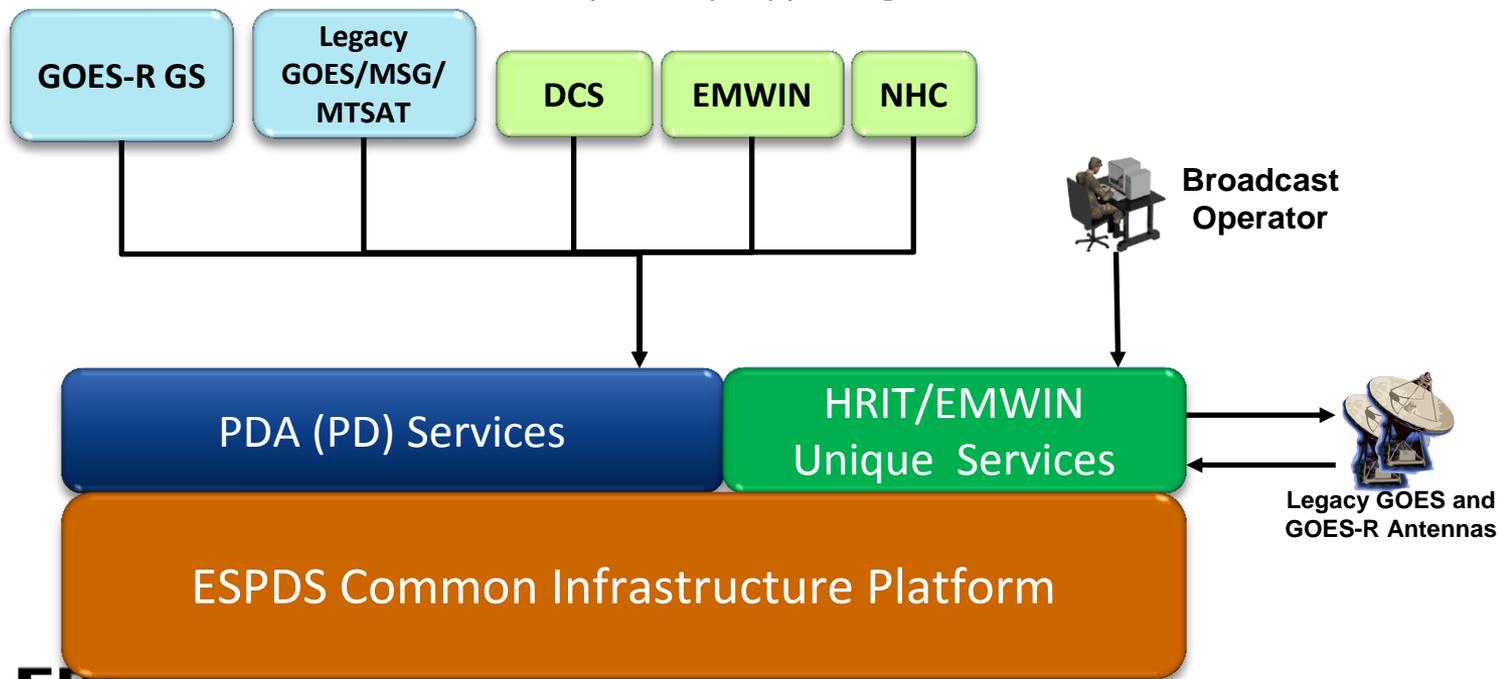
Operations - 24/7 Monitoring

# HRIT/EMWIN



## High Rate Information Transmission (HRIT) / Emergency Managers Weather and Information Network (EMWIN)

- ▶ Provides the ability to uplink DCS, EMWIN, and NHC messages/alerts, as well as Legacy GOES and GOES-R products for broadcast via the Legacy GOES and GOES-R satellites
- ▶ Includes bandwidth-based automated prioritization capabilities
- ▶ **Exploits ESPDS PDA and Common Infrastructure functionality & flexibility for cost savings**
  - Hosted within the ESPDS common infrastructure platform
  - Reuses PDA-provided data intake, subscription, and product tailoring services
  - Minimizes refresh of the older LRIT system by supporting both LRIT and HRIT data streams



# ESPDS Evolution

# ESPDS Evolution

Started with PDA as the ESPDS PD capability

PDA

ESPDS Common Infrastructure Platform

The Common Infrastructure in ESPDS provides a **robust and extensible** platform upon which any NESDIS application or service can be hosted

Extended PDA services to also meet Ancillary Data Relay Service (ADRS) requirements

PDA/ADRS

ESPDS Common Infrastructure Platform

Added NDE 2.0 as the ESPDS PG capability

PDA/ADRS

NDE 2.0

ESPDS Common Infrastructure Platform

Added HRIT/EMWIN as an extension of the ESPDS PD capability (reuses PDA services)

PDA/ADRS

HRIT/EMWIN

NDE 2.0

ESPDS Common Infrastructure Platform

# ESPDS Services

## PD, PG, and Infrastructure Services



### Gateway Services

Sys Admin Portal

User Portal

### Product Distribution Business Services

Product Tailoring

Search & Ad-Hoc Request

Broadcast Management

Broadcast Monitoring

Subscription

Data Integrity

Data Inventory

Broadcast Delivery

### Broadcast Hardware

Uplink Processor/  
Downlink Receiver

### Product Generation Business Services

Manage PG

Job Factory

Processing Node

Execute Algorithm

### Product Generation Support Services

Manage PM

Ingest

Monitor and Control

Infrastructure

### Common Infrastructure Management Services

#### Communications Framework

User Profile

Scheduling

Data Management

Monitoring

Logging & Reporting

Resource Management

System Config

Product Data (NAS)

Infrastructure Data (SAN)

Data Intake

Data Transmit

Stream Transport

Imagery Visualization

### ESPSC Infrastructure Services:

- Active Directory and Centrify
- Tripwire Log Center
- Tripwire Enterprise
- McAfee ePO
- SolarWinds Orion
- Red Hat Satellite Server
- WSUS
- EMC NetWorker
- DNS/DHCP/NTP
- Tenable Nessus

### LEGEND:

ESPDS Infrastructure

ESPDS PD

ESPDS PG

HRIT/EMWIN  
Unique



# ESPDS Benefits

# ESPDS Benefits

## ▶ To End Users:

- ***Ensures highly available and reliable access*** to human and machine interfaces that scales to accommodate the growing user and data demands
- Provides ***flexibility to quickly adapt to changes*** in end user requirements

## ▶ To System Operators/Administrators:

- ***Easily scalable*** hardware and software
- Provides ***automated operations***
- ***Compliant with IT security requirements*** for a High Impact system

## ▶ To NOAA/NESDIS As A Whole:

- ***Scalable and secure foundation*** to support enterprise environmental satellite services across NOAA/NESDIS
- Removes mission-specific stovepiping
- Paving the path toward ***modernized data centers***



# Questions

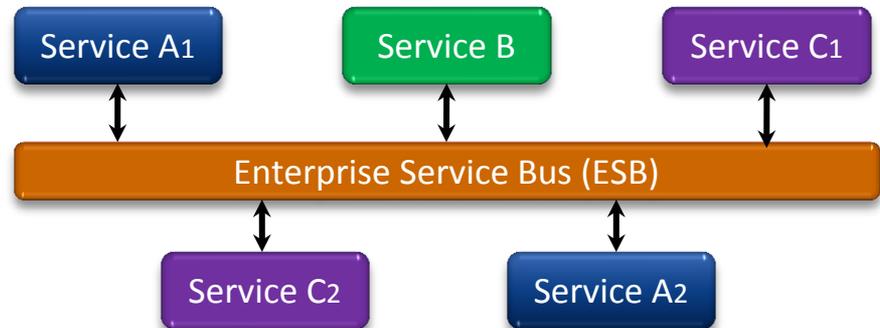




# BACKUP

# Service-Oriented Architecture

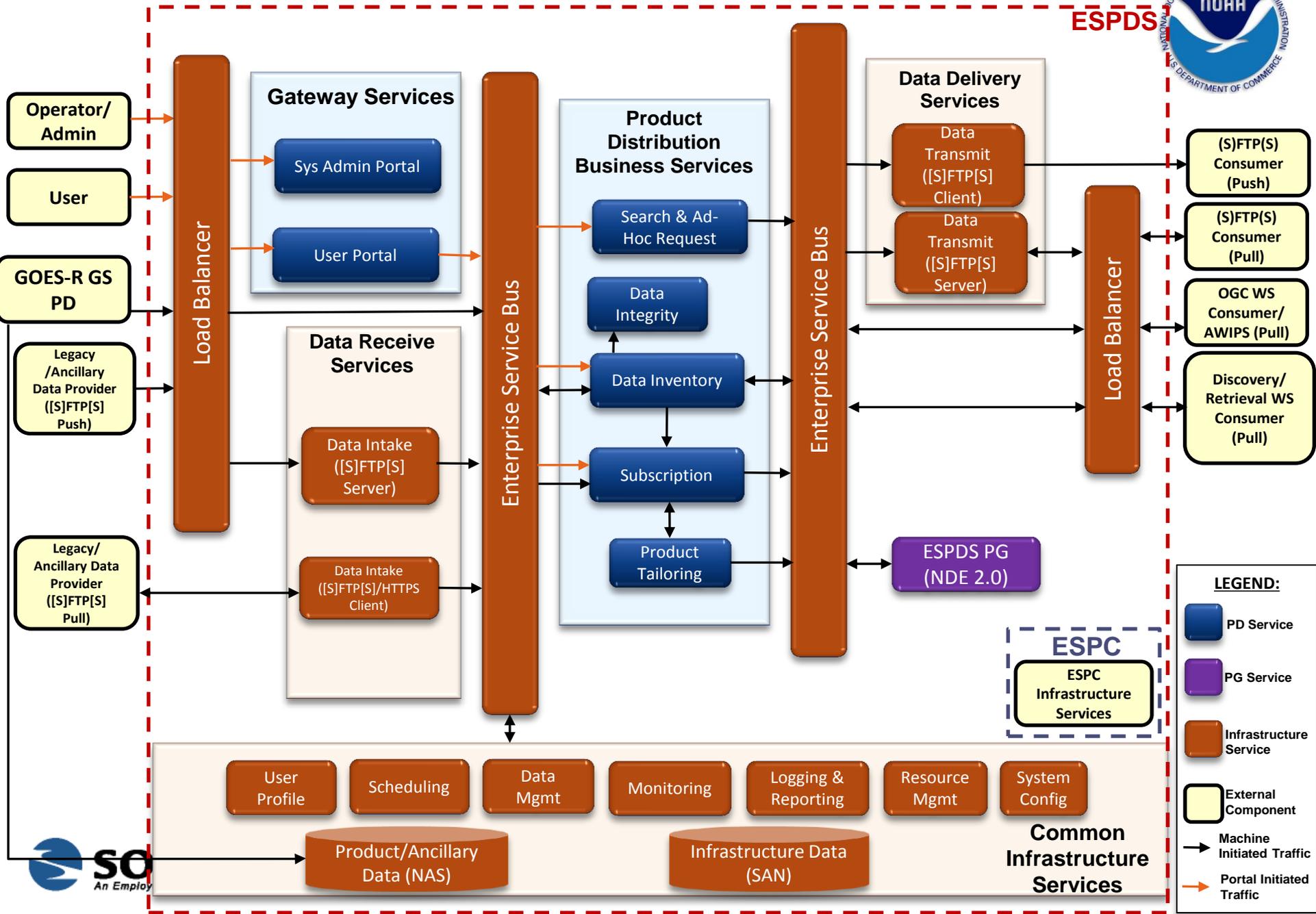
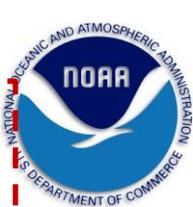
*A SOA seeks to separate the implementation of a service from its interface. **How** the service performs its function is irrelevant when compared to **what** the service does.*



- ▶ Each service within a SOA:
  - Provides a specific set of functions/capabilities
  - Communicates with other services via messages in accordance with a service contract that defines inputs and outputs, as well as pre- and post-conditions
- ▶ Multiple instances of each service can coexist for scalability and high availability
- ▶ An Enterprise Service Bus (ESB) provides mechanisms for:
  - Ensuring that messages are delivered (Quality of Service)
  - Handing off message processing responsibility to another available service in the event of a service failure

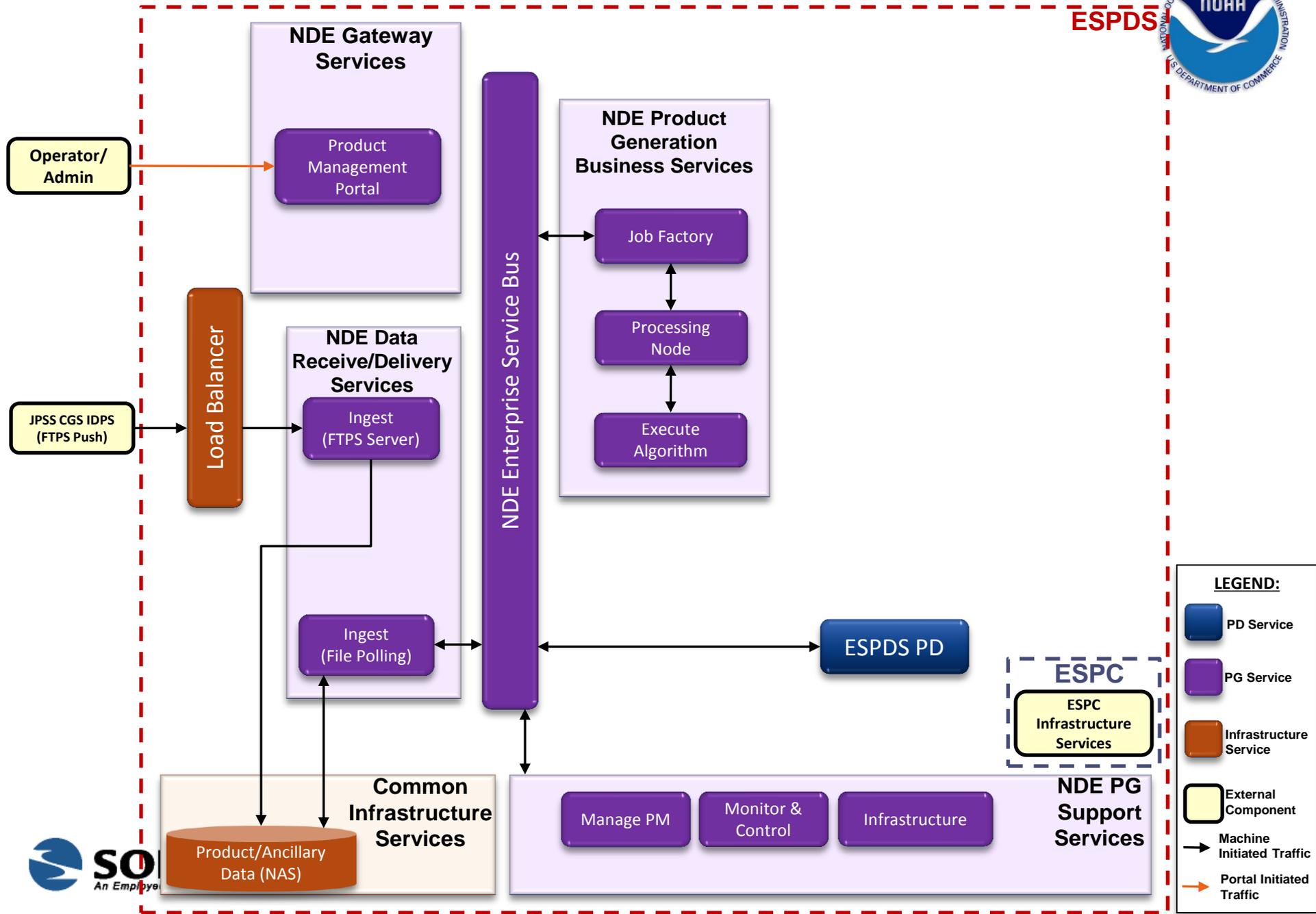
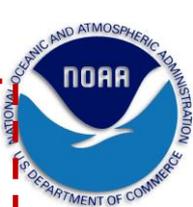
# ESPDS PD and Infrastructure Services

ESPDS



# ESPDS PG Services

ESPDS

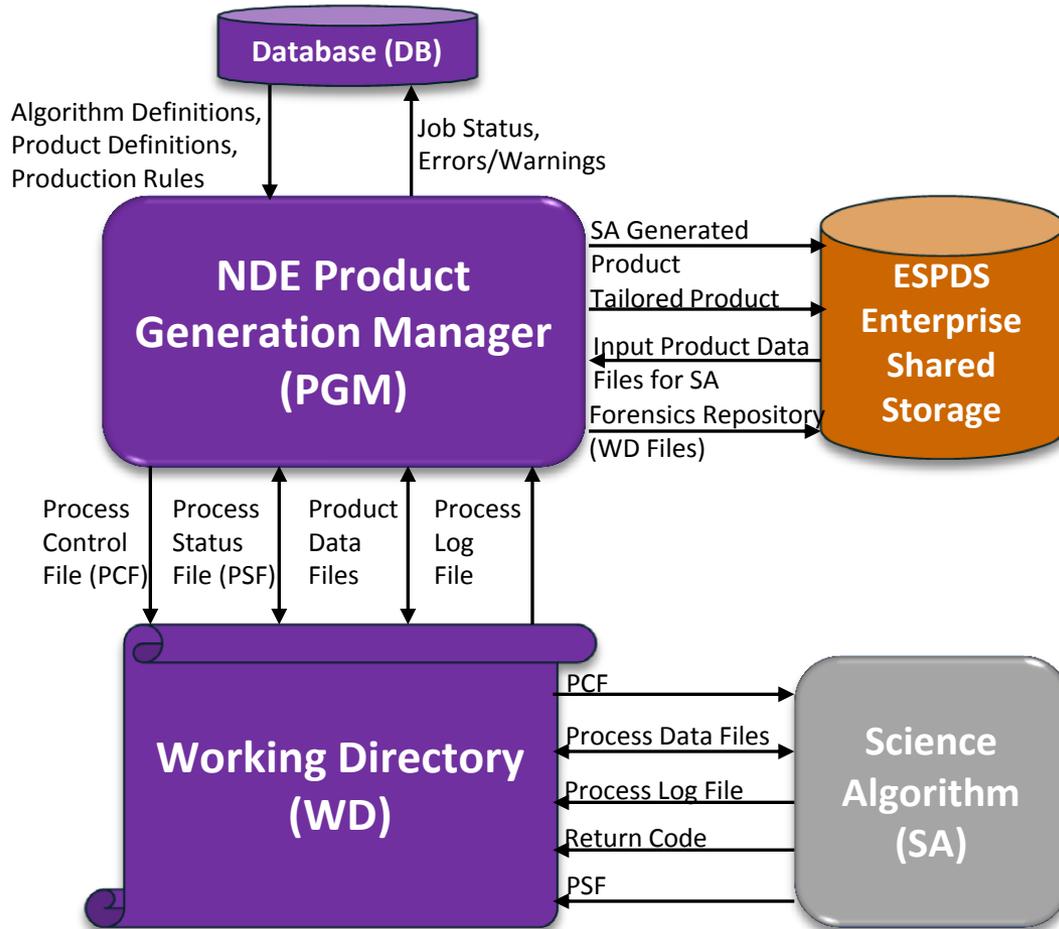
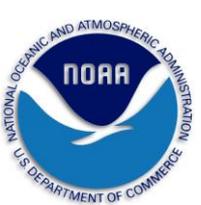


**LEGEND:**

- PD Service
- PG Service
- Infrastructure Service
- External Component
- Machine Initiated Traffic
- Portal Initiated Traffic



# NDE PG Science Algorithm Integration and Execution



- Database (DB) contains all the information necessary to initiate execution of a Science Algorithm (SA)
- NDE Product Generation Manager (PGM) controls the flow of information for executing SAs and generating products.
- The Working Directory (WD) is created by the PGM and contains the Process Control File (PCF) and a Process Status File (PSF).
- In the event that a SA job fails, the PGM creates a forensics repository and copies the contents of the SA's WD to the ESPDS Enterprise Shared Storage for later analysis.



# NDE 1.0 Operations

## 30 Day Performance (December 2014)

<b>Ingest</b>	
Ingested Data	103 TB (4,904,851 files)
<b>Product Generation</b>	
Number of Production Jobs	1,510,997
Generated Data	25.1 TB (2,815,623 files)
Production Job Success Rate	99.992%
<b>Product Distribution</b>	
Distributed Data	28.8 TB (4,481,362 files)
Distribution Job Success Rate	99.947%
<b>Subscription Based Services</b>	
Number of Users	29
Number of Subscriptions (active)	254