

Lessons learned migrating science algorithms from OSPO on premise to NCCF

National Environmental Satellite, Data, and Information Service

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Background

NESDIS/OSPO's operational on-premises product generation included legacy stovepipes and the NDE Product generation system to produce operational satellite products.

- Number of Algorithm Packages running in NDE: **45**
  - Mostly JPSS Level 2 or EDRs
  - Some GOES - R Level 2 products
  - Some Level 3 Blended products
- Number of Algorithm Packages running on OSPO Legacy Servers: **32**
  - Level 1B products
  - Metop Level 2 products
  - Level 3 and Level 4 Blended products

Algorithm Scientific Software and System Transition Team (ASSISTT) has supported the migration of the science algorithm packages from on-premises systems to NESDIS Common Cloud Framework (NCCF) Operations

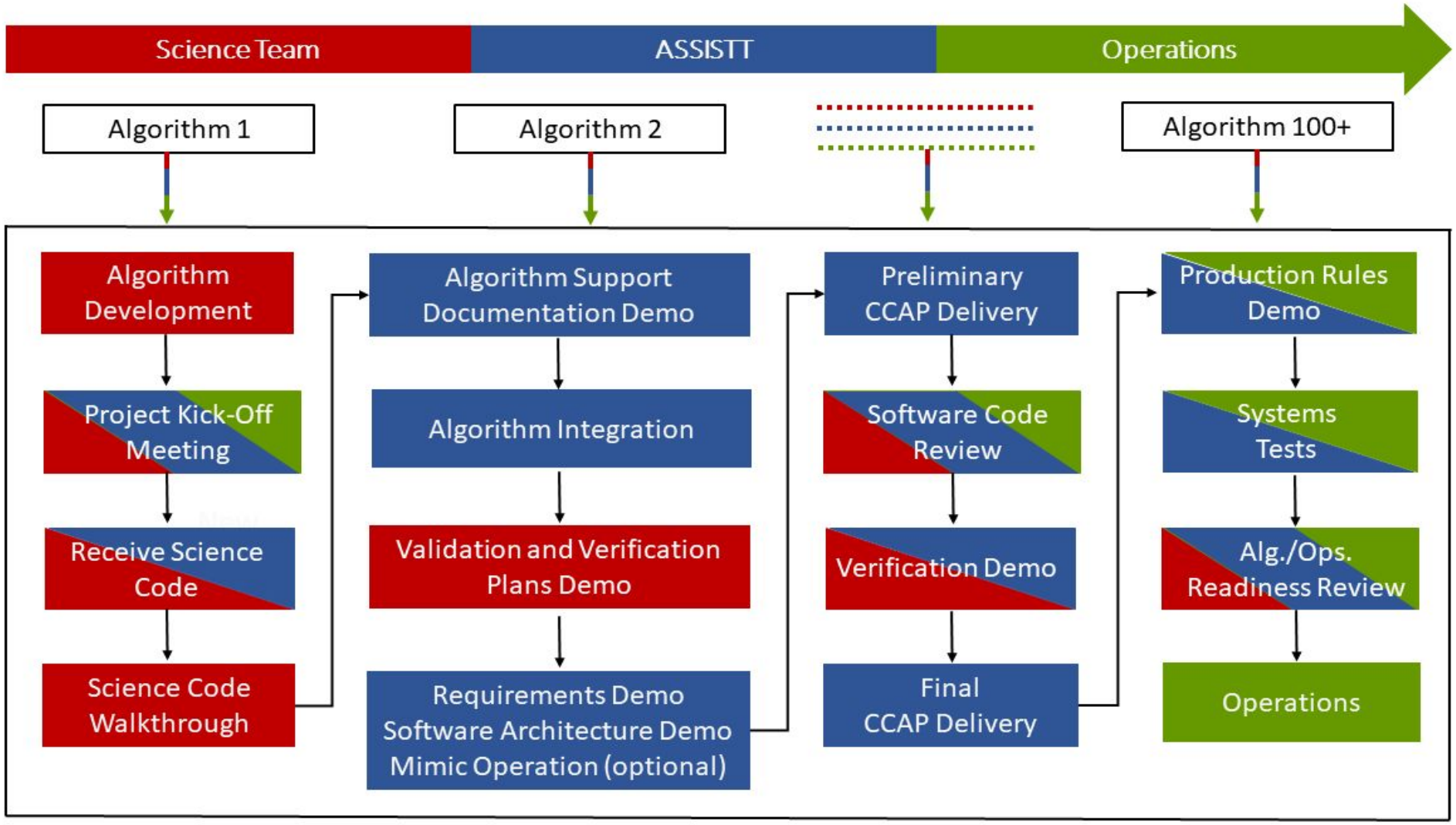
This talk will discuss some challenges we faced around the **People, Process** and **Technology,** how we **worked through** them and what we **learned** from them.

Purpose of Documenting and Sharing Lessons Learned

- *Change is disruptive!*
- IT Migration is a HUGE change, not just technologically, but also to the people involved.
- The lessons learned will help us anticipate, navigate and mitigate some of the challenges in our next migration!



ASSISTT Workflow





Challenges (1/2)

- **Technology**
  - Legacy algorithms on stovepipe systems
  - IBM to Linux conversion of legacy software
  - The target operational system on the Cloud was **inaccessible** to ASSISTT
  - Learning about the new target system and working with new NCCF Integration team for implementing the algorithm packages
  - Deciphering the production rules used in OSPO operations especially for legacy applications



Challenges (2/2)

- **People**
  - Evolving from stovepipe systems to containerized algorithms running within a common infrastructure
  - Training new ASSISTT members who were brought on to support this migration as well as continue working on enhancements and new products being transitioned to Ops as well as to support migration of the science teams from on-prem development to Cloud.
- **Process**
  - Lack of established feedback loops.
  - Efficient communication channels.
  - Effectively communicating progress, setbacks and constraints.



Key Actions

- Technology:
  - Standardization
- People:
  - Communication
  - Training
- Process:
  - Standardization
  - Communication



Standardizations (1/3)

- **Standards for Cloud Containerized Algorithm Package (CCAP)**
  - Delivery standards
  - Filename standards
  - Metadata standards

- **Delivery Document Standardization**
  - Production Rules Document
  - Readme
  - Delivery Documents



Standardizations (2/3)

- **Code Standardization**
  - Command line interface
  - Configuration files
  - File system organization
  - Executable build process
  - Runtime environment setup
  - Improved review processes using version control (GitLab)

- **Test case Standardization**
  - Covering all cases including backup satellites
  - Covering change of year cases
  - Adding gcov to evaluate code coverage



Standardization (3/3)

- **Workflow/Process Standardization**
  - Agile Methodology implemented
    - Standard checklist to create backlog for all common tasks
  - Demonstrations to Stakeholders
    - Requirements demo
    - Software Architecture demo
    - Production Rules demo
  - Quality Checks before delivery of algorithm package
    - Use of in-house and third party checkers for metadata and CF compliance
  - Quality Assurance of the products produced by NCCF

Communication Improvements

Hand Shakes instead of throwing the ball across the fence!

- Understand science algorithm requirements and dependencies
- Understand stakeholder (OSPO, NCCF) needs
- Build relationships, bridging gaps between teams
- Bring concerns into the open and work on resolving them





Communication Improvements

- Details:
  - Production Rules demo to NCCF Integrators and OSPO Product Area Leads (PALs) to review production rules for implementation of CCAP in operations
  - Feedback loop set up to receive concerns from NCCF Integrators about the algorithm packages and prompt support was provided and patches delivered to resolve the issues
  - Regular schedule and status updates to stakeholders



Training

- Training integrators and product owner advisors about the new system and standards
- Taking up pathfinder and pilot projects to identify issues, both technical and process
- ASSISTT integrators encouraged to take AWS certifications



Whats Next?

Collaborate with Metadata subject matter experts to improve Metadata Standards followed by ASSISTT

Algorithm Orchestration (AO) System replacing the current Triggers Product Rules System (TPRS) in NCCF Operations and also available to ASSISTT and science teams in NCCF Dev

- AO - automated Continuous Integration and Continuous Deployment system for scientific applicaiton

This will ensure that all parties involved in the development of the algorithm package have access to the system that will generate the products



Conclusion

ASSISTT's understanding of the target system has improved.

ASSISTT has updated document templates based on feedback from NCCF Integrators.

Process and Communications improvement has helped identify issues and provide support to NCCF algorithm integration