The Integrated Dissemination Program

March 20, 2019

Topics

- What is IDP (Integrated Dissemination Program)?
- What applications run on IDP
- How IDP is supported
- Questions

What is IDP?

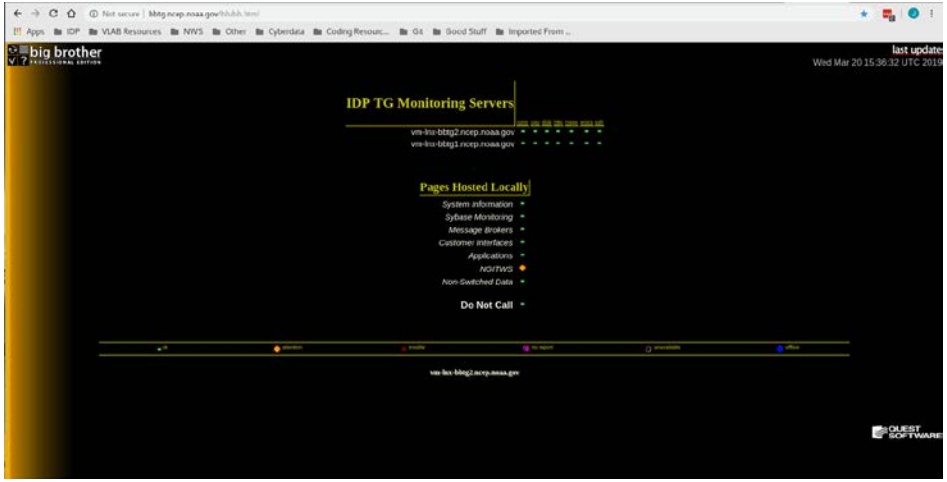
- NOAA's Integrated Dissemination Program (IDP) was established to transform the Weather Services' 170+ web sites and 20+ operational dissemination capabilities to an integrated, enterprise-wide, dissemination service with redundancy capabilities.

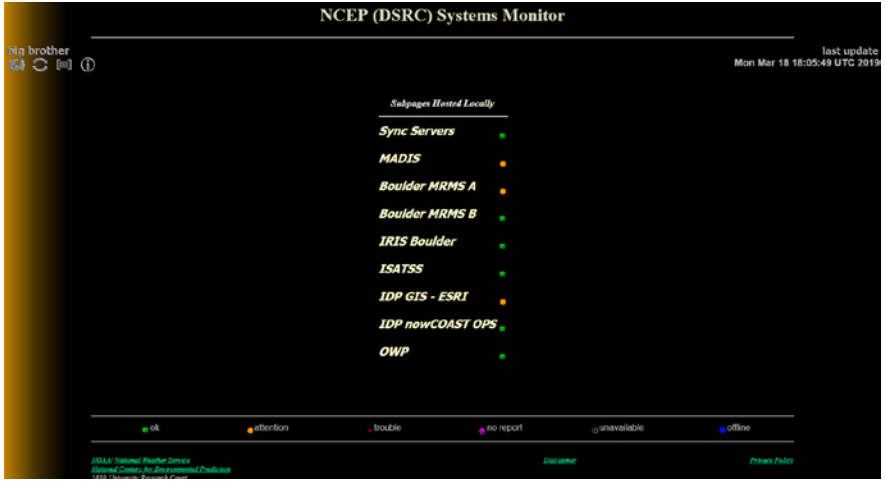
- IDP is supported and maintained within NCEP Central Operations (NCO). The IDP portfolio of applications are managed by the Office of Dissemination.

- The Office of Dissemination is the first stop in the process of migrating an application onto IDP.
  - Today there are roughly 10 new projects waiting for their turn to be onboarded
  - The Office of Dissemination evaluates all incoming applications and sets priorities

Tiered Support of IDP

- NCO supports all aspects of IDP including
  - Tier 1 support is provided by the Operations and Monitoring Branch (OMB). The SDM and Tech Control teams provide 24x7 monitoring of the IDP hardware, the operational virtual machines (VMs), and the operational application running on these VMs.



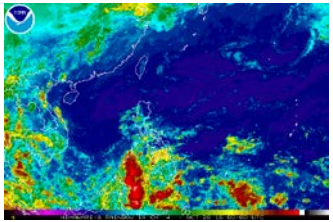


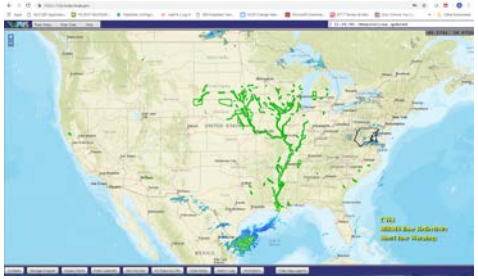
Tiered Support of IDP

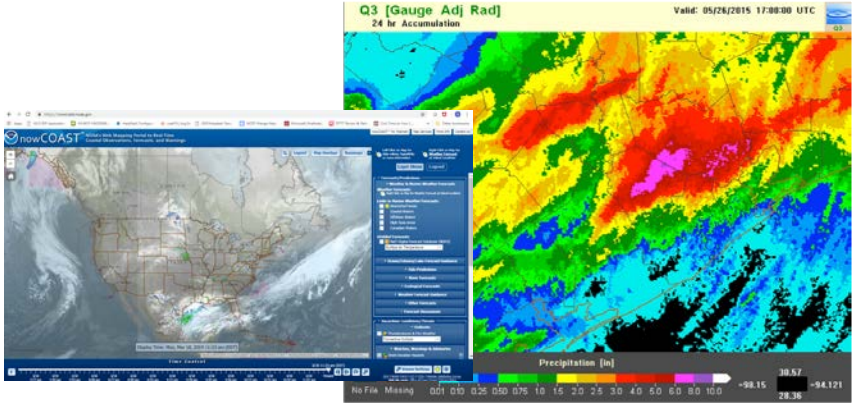
- Tier 2 support is provided by the Implementation and Data Services Branch (IDSB). Responsibilities of the Onboarding Team (OBT) include:
  - Provide 24x7 support for the application and output, troubleshooting operational issues using numerous tools
  - Test and implement any updates or fixes to the application.
  - Work with development organizations to onboard new applications
  - Respond to customer requests with regards to data availability/quality. Work with Tier 3 to resolve data quality issues.
  - Work with the developers to optimize the application
  - Perform failovers of the operational application to support system patching and data center failovers. Complete validation of the operational application after application failovers.
- Tier 3 support is provided by the application's development organization according to the agreement stated within the roles and responsibilities document

About the IDP Applications

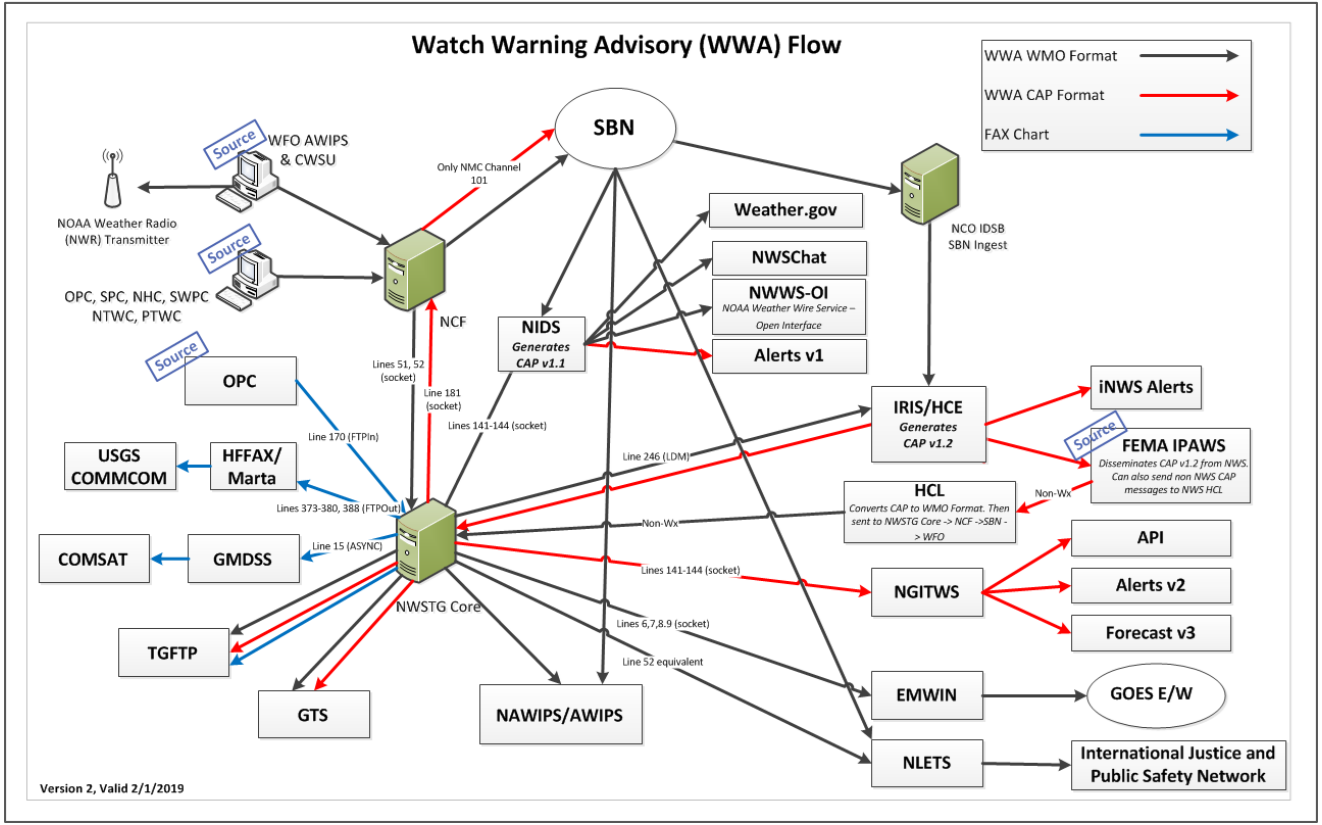
- MADIS (Meteorological Assimilation Data Ingest System) (https://madis-data.ncep.noaa.gov/MadisSurface/)
- MRMS (Multiple-Radar / Multiple-Sensor) (https://mrms.ncep.noaa.gov/data)
- NGITWS (NextGen IT Web Services)
- Weather.gov API (https://api.weather.gov)
- DataStreme (AMS DataStreme)
- EDIS (Email Data Input System)
- Himawari (Japanese Geostationary Satellite Himawari-8)
- IRIS/iNWS/HCE (Integrated Real-time Impacts Services and Hazards Collection Extended) (https://iris.ncep.noaa.gov/) (https://inws.ncep.noaa.gov)
- NowCOAST (NowCOAST (https://nowcoast.ncep.noaa.gov/))
- IDP-GIS (IDP-GIS) (https://idpgis.ncep.noaa.gov)
- HCL (Hazards Collection Legacy)
- iSatSS (GOES 16 and 17 Satellite Subsystem)
- OWP Post Processing (Office of Water Prediction) (https://nomads.ncep.noaa.gov/pub/data/nccf/com/nwm/post-processed/)
- GMDSS (Global Maritime Distress and Safety System)
- NLETS (National Law Enforcement Telecommunications Systems)
- NWSTG National Weather Service Telecommunications Gateway







Watch, Warning and Advisory (WWA) Data Flow



Software/Infrastructure Supportability

- The applications running on IDP vary widely in scripting/programming languages, as well as software and database layers. The OBT supports:
  - C, C++, Perl, Python, Fortran, Java, Javascript, Bash
  - PostgreSQL, MySQL, SQL Server, MongoDB Databases
  - Message queues such as RabbitMQ and LDM
- The OBT is required to have a unique skill set to not only understand numerous languages, but also network and system infrastructure
  - We support Red Hat Enterprise Linux 6, 7 and AIX
  - Use of numerous tools to troubleshoot network and systems to include:
    - VCenter
    - Citrix
    - Scrutinizer

Application Infrastructure

- All new applications on IDP consist of two instances at NOAA Center for Weather and Climate Prediction (NCWCP), College Park, MD, and the David Skaggs Research Center (DSRC), Boulder, CO, and independently provide primary and backup functionality
  - Both data centers are scalable, robust, secure, and supported 24x7x365 operationally
  - Aim to perform failovers without users ever noticing
  - Continuous system scanning and monitoring for security vulnerabilities and detection of security threats or intrusions
  - Utilize both local Citrix Load Balancing infrastructure and commercial Akamai services
- IDP runs on a cluster of Dell Virtual Machines (VMs) that are capable of easily adding cores, memory and storage.
  - Cores, memory and I/O bandwidth are shared in resource pools using VMware and NetApp
  - Each VM consists of 2.5GHz/processor, each processor has 213GB of memory
  - Each data center consists of 4.2 petabytes of storage
  - Each data center consists of 412 VMs just supporting IDP

Frequency of Onboarding Implementations

- The upgrade frequency of existing applications is about twice a year
- The OBT is typically working 4 upgrades to existing applications at a given time
  - Work closely with the development organization
  - Regression testing
  - Functional testing
  - Performance testing
  - Validation testing
- Only 1 new application at a time is activated on a path to operations
  - This effort consists of multiple teams across NCO to include, OBT, Dataflow, Network, and Infrastructure
  - This typically takes between 7-11 months from kickoff to implementation

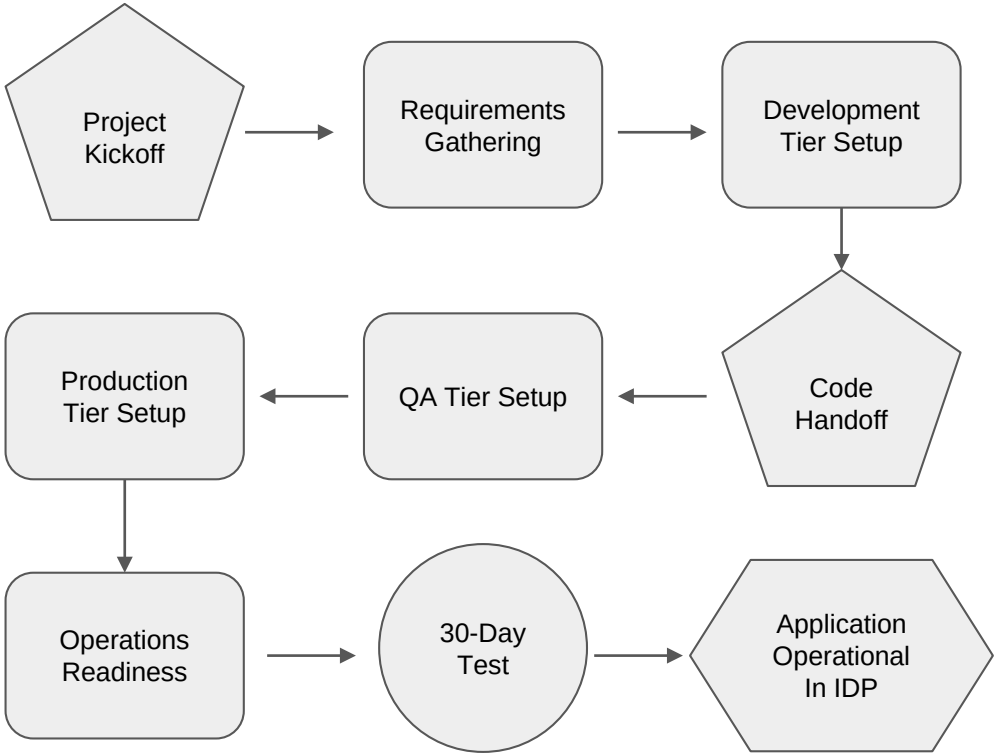
Normal Day

- NCO is a complex, fast-paced work environment
- Strive to meet deadlines for project plans and balance supporting operational issues that arise unexpectedly.
  - NCO plans on average that 2 people stay dedicated to just supporting operations and maintenance
- To complete our mission we have between 6-8 staff, mixed between contractors and feds
- The OBT is a rotating 24/7 on-call team that is dedicated to ensuring all IDP applications are running optimally for our NWS and external partners

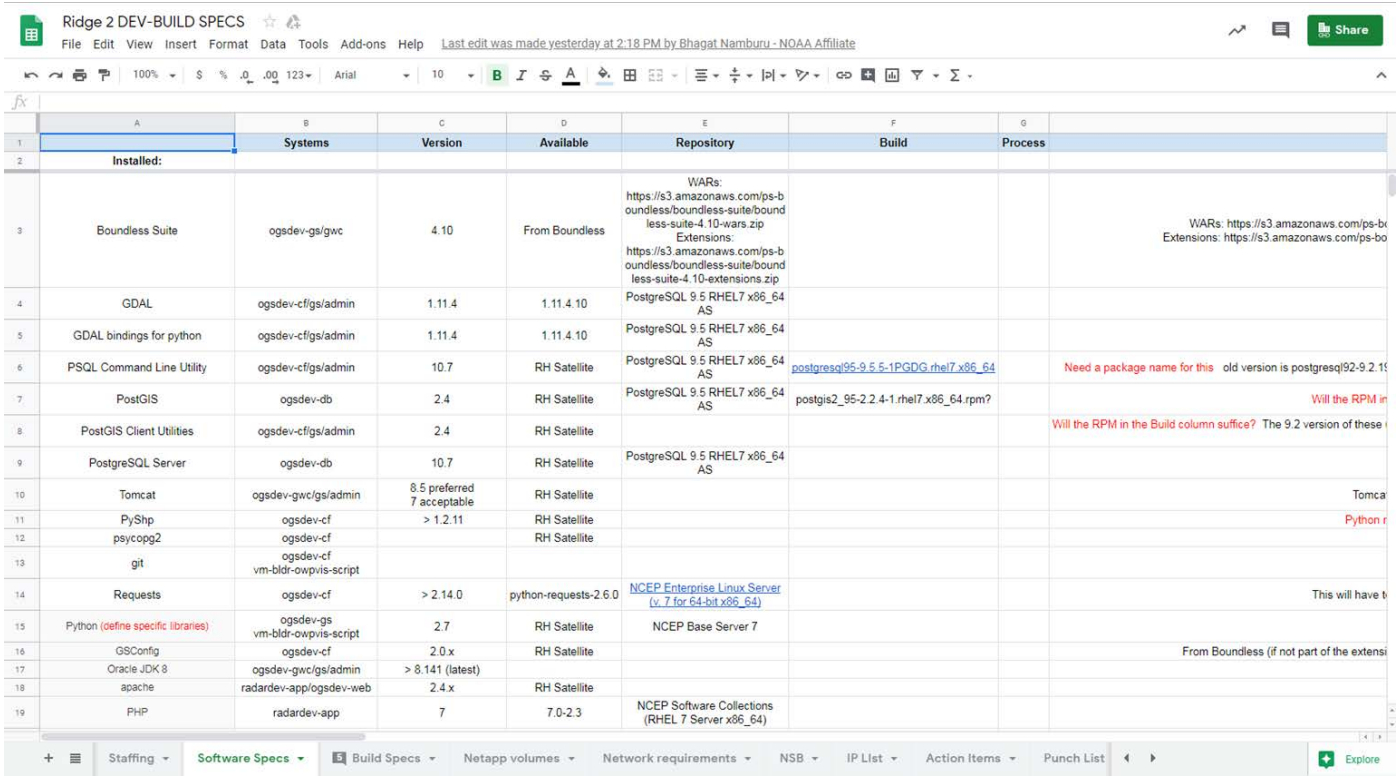
Questions

Backup Slides

The Onboarding Process



Operations Planning: Build Specs



Ridge 2 DEV-BUILD SPECS

File Edit View Insert Format Data Tools Add-ons Help Last edit was made yesterday at 2:18 PM by Bhagat Namburu - NOAA Affiliate

Share

	Systems	Version	Available	Repository	Build	Process	
Installed:							
Boundless Suite	ogsdev-gs/gwc	4.10	From Boundless	WARs: https://s3.amazonaws.com/ps-boundless/boundless-suite/boundless-suite-4.10-wars.zip Extensions: https://s3.amazonaws.com/ps-boundless/boundless-suite/boundless-suite-4.10-extensions.zip			WARs: https://s3.amazonaws.com/ps-bo Extensions: https://s3.amazonaws.com/ps-bo
GDAL	ogsdev-cf/gs/admin	1.11.4	1.11.4.10	PostgreSQL 9.5 RHEL7 x86_64 AS			
GDAL bindings for python	ogsdev-cf/gs/admin	1.11.4	1.11.4.10	PostgreSQL 9.5 RHEL7 x86_64 AS			
PSQL Command Line Utility	ogsdev-cf/gs/admin	10.7	RH Satellite	PostgreSQL 9.5 RHEL7 x86_64 AS	postgresql95-9.5.5-1PGDG.rhel7.x86_64		Need a package name for this old version is postgresql92-9.2.19
PostGIS	ogsdev-db	2.4	RH Satellite	PostgreSQL 9.5 RHEL7 x86_64 AS	postgis2_95-2.2.4-1.rhel7.x86_64.rpm?		Will the RPM in
PostGIS Client Utilities	ogsdev-cf/gs/admin	2.4	RH Satellite				Will the RPM in the Build column suffice? The 9.2 version of these
PostgreSQL Server	ogsdev-db	10.7	RH Satellite	PostgreSQL 9.5 RHEL7 x86_64 AS			
Tomcat	ogsdev-gwc/gs/admin	8.5 preferred 7 acceptable	RH Satellite				Tomcat
PyShp	ogsdev-cf	> 1.2.11	RH Satellite				Python r
psycopg2	ogsdev-cf		RH Satellite				
git	ogsdev-cf vm-bldr-owpvis-script						
Requests	ogsdev-cf	> 2.14.0	python-requests-2.6.0	NCEP Enterprise Linux Server (v. 7 for 64-bit x86_64)			This will have t
Python (define specific libraries)	ogsdev-gs vm-bldr-owpvis-script	2.7	RH Satellite	NCEP Base Server 7			
GSConfig	ogsdev-cf	2.0.x	RH Satellite				From Boundless (if not part of the extensi
Oracle JDK 8	ogsdev-gwc/gs/admin	> 8.141 (latest)					
apache	radardev-app/ogsdev-web	2.4.x	RH Satellite				
PHP	radardev-app	7	7.0-2.3	NCEP Software Collections (RHEL 7 Server x86_64)			

Staffing | Software Specs | Build Specs | Netapp volumes | Network requirements | NSB | IP List | Action Items | Punch List | Explore

Build Specs Include:

1. App Specs
2. Software Specs
3. Build Specs
4. Netapp Volumes
5. Network Requirements
6. Action Items
7. Punch List
8. Puppet Classes
9. User Accounts
10. Monitoring

IDP Onboarding Sequence

1

Dev Tier gets provisioned first. Developers develop and install on this hardware to prove the software works in the NCO virtualized environment. Any adjustments to the resources allocated would be done at this stage.

2

QA tier gets provisioned once the developers have verified the development tier is working as expected. Installation is performed on the QA tier and a battery of fitness tests are performed on the environment to prove the fitness of the application to run at NCO. After this is complete we put the application in a 30 day test mode in which the application is left undisturbed and is monitored 24x7. During this time the onboarding team develops comprehensive custom monitoring scripts.

3

Upon successful completion of the 30 day test the application gets promoted to the operational tier. By this time comprehensive monitoring scripts have been developed, the entire onboarding team has been trained to operationally support the application. The SDM and TOC have been briefed as well as the NCO director.

Process: 30 Day Entrance Checklist

☐		Systems are up to date with respect to patching and included in regular patch cycle
☐		Roles and Responsibilities document signed by all necessary parties
☐		Notification sent as required by NCO or by NWS Directive 10-1805
☐		Prepare doco/conduct training so anyone on OBT can support the app
☐		Add application to the Primary page
☐		Add applications failover/validation steps to the Data Center Failover Templates; including IWSB scripting, if necessary
☐		All output data verified
☐		Developer assertion that output is as expected

☐		Data available in real-time and confirmed by end users
☐		Acceptance Test plan executed and results reviewed approved by TL
☐		All downstream dependencies within NCO have been tested and verified by developers (including IDP and WCOSS dependencies!)
☐		OMB review of monitoring
☐		Monitoring moved to operational BB
☐		Email sent announcing start date of 30-day test
☐		Email sent to all NCO branches about 24/7 support

Operational Readiness Test

- Acceptance testing - does it function as envisioned by the developers?
  - Go through each function it is expected to perform
  - In some cases create special test situations
- 30 Day test - does it function in normal operation?
  - Can catch situations the developers never thought of
- Extended testing (“trample testing”) - characterize how things fail (not how they work) when:
  - Network goes down
  - Host is rebooted at random times
  - Host loses access to remote disks
  - Host loses DNS service
  - Helps improve monitoring scripts and troubleshooting procedures

Process: Go Live Briefing

☐		Pass 30-day test
☐		Create Public Release Notes document for users and execs
☐		Prepare a go-live briefing
☐		Go-Live briefing reviewed by TL
☐		Go-Live briefing reviewed by Branch Chief
☐		Go-Live briefing reviewed by Development Organization
☐		Submit RFC for go-live (could be right after briefing depending on timing)
☐		Update the IDP data description to include the new app
☐		Prepare doco/conduct training so anyone on OBT can support the app

Process: Implementation Day

☐		Check SOE and confirm CWD is not active
☐		Send rfc_notify to begin implementation
☐		Perform implementation
☐		Send rfc_notify to complete implementation
☐		Send notification to Executive mailing list -- nco_exec_notify@noaa.gov with public release notes