



NOAA Response to the DAARWG Recommendations on the NOAA Cloud Strategic Action Plan

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Purpose

To provide an informational overview on how NOAA responded to the Data Archiving and Access Requirements Working Group (DAARWG) recommendations on the NOAA Cloud Strategic Action Plan Draft (submitted in March 2021). The following information describes the eight (8) DAARWG recommendations and how they were addressed in the latest draft version of the NOAA Cloud Strategic Action Plan.

Background

The [DAARWG's recommendations](#) were provided to the Environmental Data Management Committee (EDMC) in March 2021 after reviewing the NOAA Cloud Implementation Plan. Since this time, the NOAA Cloud Action Plan writing team has developed and approved the final draft document, now titled the "[NOAA Cloud Action Plan](#)," after thorough review/approvals from each line office, NOAA CIO Council, NOAA S&T Strategies committee, NOAA Science Council (100+ comments).

Issue

Some of the comments in the DAARWG report may have already been addressed in the latest version of the [NOAA Cloud Action Plan](#). **This version is not yet live/available to the public.** Pre-existing comments in this version are in preparation for Dr. Spinrad's review as some of the comments he made on the Data Plan were also applicable for cloud implementation.

NOAA Coordination & Views

- Coordination with:
 - *Internally: NOAA Cloud Committee (NCC), CIO Council, Line Office (LO) representatives, NOAA Science Council, NOAA S&T Synergy Committee*
 - *Pending: NEP & NEC concurrent review*
 - *Others: NOAA Science Advisory Board (SAB) & DAARWG*
- NOAA has addressed comments and recommendations from the DAARWG in the updated NOAA Cloud Strategic Action Plan and offers to update areas below, as necessary.

Desired Outcome

Receive feedback from the NOAA SAB on how NOAA/NCC responded to the DAARWG's recommendations for next steps on the final version of the NOAA Cloud Strategic Action Plan **(specifically regarding recommendation #6)**.



Summarized DAARWG Recommendations & NOAA Responses

#	DAARWG Recommendation	NOAA Response
1	Highlight and prioritize key actions relative to all the other actions of varying importance.	In coordination with the NOAA Cloud Committee (NCC), actions have been re-organized in the latest version of the Action Plan. NCC would like to propose that the Cloud PMO, once established, take on this action in consultation with the NCC and Chief Information Officer Council (CIOC).
2	Consider how to quickly establish an exploratory environment (Action 1.1.4) as soon as possible.	<p>This is now 1.1.1 in the updated plan: In FY22, establish an exploratory environment with appropriate security controls for cloud service tests and trials. Create a sandbox platform where cloud-native tools and NOAA data are available for NOAA scientists and partners to develop innovative solutions. The environment will have a low barrier to entry by addressing security, billing, authentication, and change control.</p> <p>Please see background slides for additional information on what is being done across NOAA.</p>
3	Reduce or consolidate the number of actions.	This has been addressed in the updated plan. A great number of actions have been reduced, of the 54 actions many are in progress or completed.
4	Indicate how the plan can be adjusted during execution for greater agility.	Agree. The plan is a living document that can be adjusted as we mature our cloud journey. PMO, NCC and CIOC have the ability to suggest/make required course corrections. CIOC will oversee and guide changes.
5	Provide a greater emphasis on training for diverse constituents. Training is critical. (See detailed section below for context on DAARWG comment regarding training on action 5.1.1)	Overall agreement (already being implemented, see detailed section below/accompanying slides for current NOAA actions) and has been updated in the new version of plan. Action 5.1.1 has since been updated in the new version of the plan.
6	Include discussion of how NOAA might leverage the more unique benefits of the Cloud beyond mere infrastructure.	We agree and have suggestions for discussion points (in detailed section below) to be reviewed for recommendation.



7	Indicate whether collaboration on data co-location with other agencies would be desirable and possible.	Agreed, it is happening (in detailed section below). Collaboration was considered at a high-level and was added in the updated version of the plan under Objective 2.6: Engage other Federal agencies to identify and leverage best practices for cloud migration and lessons learned applicable to NOAA's use cases for the cloud. As well as, 2.6.1: By FY23, identify and engage in relevant cross-agency communities of practice to share cloud knowledge, to provide NOAA with access to other agency cloud subject-matter experts (SMEs), and to promote collaboration across agencies.
8	Indicate what constitutes progress or success for NOAA in its Cloud adoption. It is not clear how the impact and success of this Plan will be measured.	Agreed. The NCC will be tracking Cloud Action Plan milestones in Smartsheets. In addition, the NOAA Office of Data Dissemination (NODD) is developing metrics that will provide accession rates. User feedback should be incorporated to provide evidence of progress or success. NODD encourages users to share their needs and challenges so that we can address them as feasible.

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Detailed DAARWG Recommendations & NOAA Responses

1: Highlight and prioritize key actions relative to all the other actions of varying importance.

In coordination with the NOAA Cloud Committee (NCC), actions have been re-organized in the latest version of the Action Plan. NCC would like to propose that the Cloud Project Management Office (PMO), once established, take on this action in consultation with the NCC and Chief Information Officer Council (CIOC).

2: Consider how to quickly establish an exploratory environment (Action 1.1.4) as soon as possible.

This is now 1.1.1 in the updated plan: *In FY22, establish an exploratory environment with appropriate security controls for cloud service tests and trials. Create a sandbox platform where cloud-native tools and NOAA data are available for NOAA scientists and partners to develop innovative solutions. The environment will have a low barrier to entry by addressing security, billing, authentication, and change control.*

Informational Example for Recommendation 2:

- Title: The U.S. Integrated Ocean Observing System (IOOS) Program run by NOS is



developing a Cloud Sandbox Project with funding provided under the Infrastructure [Investment and Jobs Act](#).

- Description: This project will deploy an instance of the IOOS Coastal Modeling Cloud Sandbox inside the NOAA Cloud Services framework to run coastal model experiments in the cloud. The instance will provide a framework and governance for running models including configuration requirements, model code and required libraries, input data and analysis of model outputs. This project will support development of services and HPC for validation.
- Expected Result: Users will be able to fully run coupled models on the Sandbox instance and make outputs available to operational systems, demonstrating viability of the cloud environment for operations. This will support and accelerate the development in an exploratory environment, while aiding in operational coastal forecasting, and can be used as a best practice/case study.

Other Noteworthy Implementations:

- NOAA Fisheries has established a Google Cloud Platform/Sandbox.
- NESDIS has launched a sandbox on Amazon Web Services (AWS).
- NOAA Open Data Dissemination (NODD) is supporting these exploratory efforts, using Cloud Service Provider (CSP) credits for NOAA scientists and partners to develop innovative solutions and format transitions. The data is then made available on NODD for others to leverage.

3: Reduce or consolidate the number of actions.

This has been addressed in the updated plan. A great number of actions have been reduced and completed.

4: Indicate how the plan can be adjusted during execution for greater agility.

The plan is a living document that can be adjusted as we mature our cloud journey. NOAA Cloud PMO, NCC and CIOC have the ability to suggest/make required course corrections. CIOC will oversee and guide changes.

5: Provide a greater emphasis on training for diverse constituents. Training is critical.

This has been updated in the new version of plan. There is agreement that training is critical and many actions are already underway across NOAA:

- Informational Example 1: NOAA Open Data Dissemination partners with Cloud Service Providers (CSPs) and Earth Science Information Partners Federation (ESIP) to provide small group cohorts - within the NOAA Cloud Pathfinders Program (NCPD) - access to specific experts so NOAA PIs can learn how to conduct analyses in the cloud, as well as understand the administration effort and cost without incurring any. NCPD initiates a proactive, project-based approach to accelerate learning so that scientists are poised to



harness the power of the cloud, including skill sharing around cloud native and cloud optimized systems.

- Informational Example 2: There are many cloud industry training programs available, many in which have readily available agreements and contracts for agency employees to utilize. In addition, many have referral programs which help their students obtain work experience and/or careers pathways from participating agencies.

NOAA recognizes the need to recruit all levels of talent and will utilize all hiring authorities to do so.

DAARWG Recommendation 5-Additional Comment:

- Action 5.1.1 says "provide access to cloud training resources by the CSPs [Cloud Service Providers] for project managers," but this is not sufficient. Rank-and-file software engineers need training, and should be permitted to spend work hours and project funding on taking training classes. It would be helpful to recognize the varying levels of comfort with and understanding of the cloud within the target audience for training, and enable staff to customize their individual training curriculum. See, for example, recommendation #2 of the NOAA SAB DAARWG report "Preparing for a Cloudy Future" (2019).

NCC Consensus:

- Agree. We are already providing various training opportunities across the enterprise. This action - 5.1.1 - has since been updated to the following: *In FY22, building on existing Line Office efforts, provide access to online cloud-related training resources and recommended list of courses per job function to a broad range of staff in pursuit of role-based cloud education, in accordance with the NOAA IT Workforce Strategic Plan. [NOAA Enterprise Cloud Program]*

6: Include discussion of how NOAA might leverage the more unique benefits of the Cloud beyond mere infrastructure.

There is overall agreement that NOAA must leverage the more unique benefits of the Cloud beyond infrastructure. **Suggestions for discussion points (below) are to be reviewed for recommendation.**

- Discussion Point/Suggestion 1: NOAA Open Data Dissemination (NODD) is working with a variety of partners to optimize formats, provide data use tutorials, educational seminars, and launch AI/ML efforts. NODD supports open science and interoperability challenges, and also provides near real-time data for the entire period of record on select datasets. NODD is not just for big data as it has recently added hundreds of NOAA Fisheries datasets.
- Discussion Point/Suggestion 2: It is not simply just working in the cloud. We have to get data to the cloud, not just one set of data but a wide variety of data. From ships,



aircrafts, satellites, buoys, Unmanned Aerial Vehicle (UAVs), and Remotely Operated Vehicles (ROVs). The data has to be organized and searchable. Common and or customized applications ingest data differently. There are several areas that need concentrated efforts and commitment across LOs and their programs. In many cases this equates to some level of funding. The Cloud PMO has a Cloud Center of Excellence in its tasking which will require the technical determination of where data resides or how the multiple cloud environments will be accessible by the stakeholders. We can build the space and even show what the art of the possible is to help drive innovation.

- Discussion Point/Suggestion 3: Adoption of modern frameworks such as SAFe/Agile are an important step to being able to take full advantage of the cloud. It will also better enable NOAA to rapidly adapt its products and services to current events and customer needs.

7: Indicate whether collaboration on data co-location with other agencies would be desirable and possible.

Data co-location is desirable and possible, and it is happening (see informational points below). Collaboration was also considered at a high-level and was added in the updated version of the plan under Objective 2.6: *Engage other Federal agencies to identify and leverage best practices for cloud migration and lessons learned applicable to NOAA's use cases for the cloud.* As well as, 2.6.1: *By FY23, identify and engage in relevant cross-agency communities of practice to share cloud knowledge, to provide NOAA with access to other agency cloud subject-matter experts (SMEs), and to promote collaboration across agencies.*

- Informational Point 1: NOAA Open Data Dissemination (NODD) is working with DoC to provide Census and other data to solve specific challenges for underserved communities. NODD has discussions with other non-DoC agencies, as well, and can facilitate discussions with inter-agency partnerships.
- Informational Point 2: PMO role could facilitate discussions with other agencies, along with the NODD Program. GSA also has a cloud community of practice which NOAA should participate more actively in and this could be a topic of interest.

8: Indicate what constitutes progress or success for NOAA in its Cloud adoption. It is not clear how the impact and success of this Plan will be measured.

The NCC will be tracking NOAA Cloud Strategic Action Plan milestones in Smartsheet. In addition, the NOAA Office of Data Dissemination (NODD) is developing metrics that will provide accession rates. User feedback should be incorporated to provide evidence of progress or success. NODD encourages users to share their needs and challenges so that we can address them as feasible.

NOAA Acknowledgement of Additional DAARWG Comments

DAARWG Comment	NOAA Response
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<p>Although Goal #1 is to "Enable Innovation through Rapid Adoption of Cloud-Based Services," many of the actions in the Plan seem likely to stifle innovation and to slow adoption: Establish a policy, develop dashboards, develop a plan or a model, develop an intranet, etc. NOAA programs should be given more opportunity and encouragement to experiment and to establish pilot projects in the Cloud. There should be a way to allow people to try or prototype approaches before a refined, public-facing solution is developed. Of course there must also be monitoring of costs and appropriate IT security controls, but this Plan seems overly focused on cost and security rather than actually deriving benefit from the cloud. In general, the Plan seems bureaucratic and cautious rather than agile.</p>	<p>Disagree with the general comment that this stifles innovation. Having a guiding policy, dashboards to monitor and support /monitor efforts, and enterprise plans will support innovation by providing guardrails and baseline tools that all can leverage and build on. Also, NOAA Cloud Sandboxes are already being developed by various LOs (such as NESDIS and Fisheries) and act as proving grounds to show the value of cloud services to the NOAA Science Mission.</p>
<p>There is no mention of using the lessons learned through the existing Big Data Project (BDP). This could be used as an opportunity to prototype solutions or test new approaches for NOAA to operate in the cloud.</p>	<p>These items have all been addressed in the latest version of the updated plan. We have focused on reducing duplicative line items and included comments on alignment across plans. Some items were also mentioned by Dr. Spinrad in the Data Plan so we added a comment in our updated cloud plan to address them (these changes are currently in comment form and will be implemented soon).</p>
<p>NOAA should explicitly seek to leverage existing open-source solutions. For example, Action 1.1.1 says to "develop a ticketing system" yet existing ticketing software (e.g.Jira) could doubtless be used instead of developing a new one.</p>	
<p>Objective 2.1 says "Develop a NOAA cloud strategy implementation plan" -- is this document not the Implementation Plan?</p> <p>Several actions are duplicated (e.g., both under 5.2 are "cross-referenced" to others). Suggest streamlining by only mentioning each once. If necessary, modify Objectives to avoid overlapping scope.</p>	