



# CI Compass

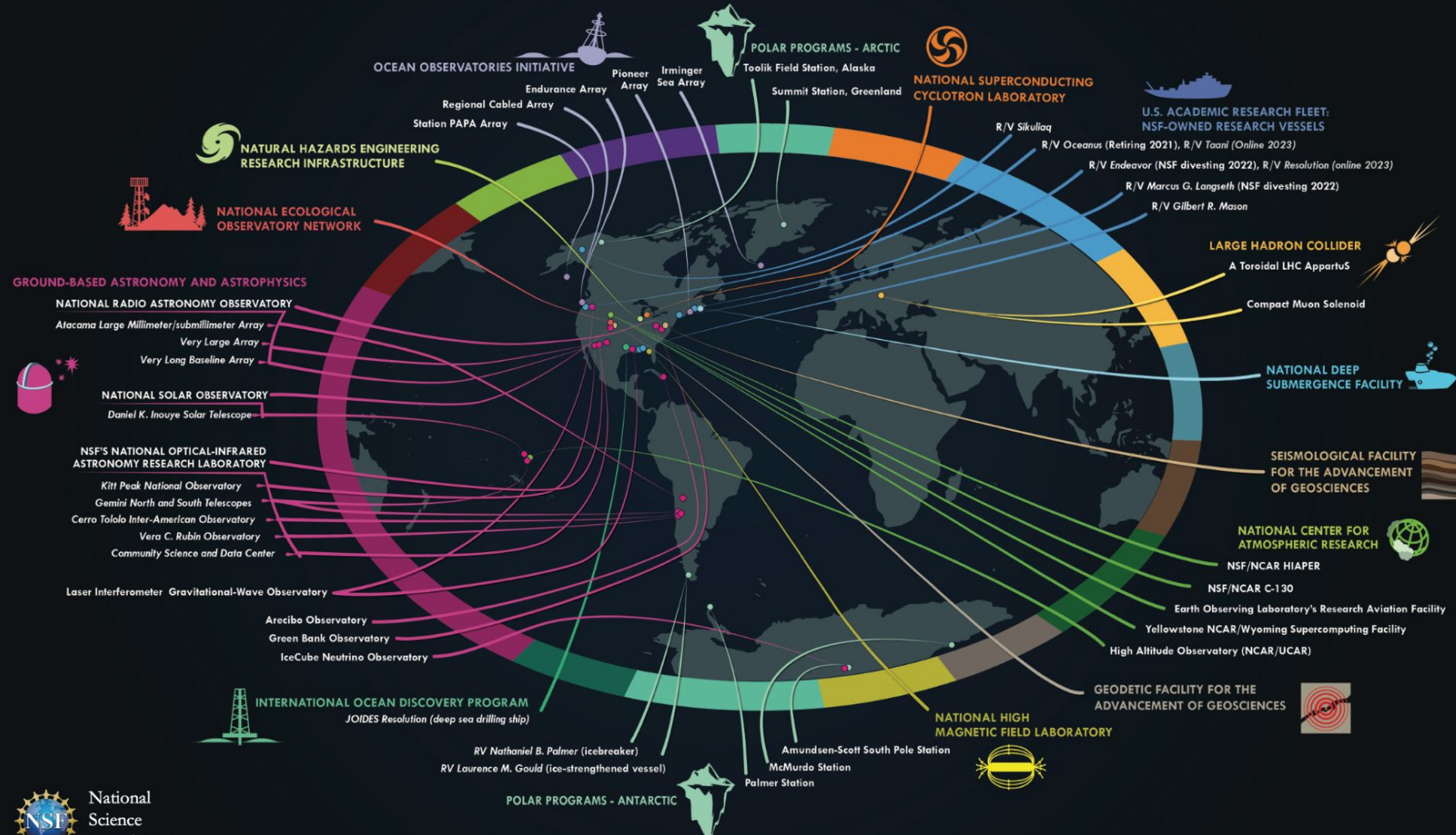
## Engaging with CI Compass

**Anirban Mandal**

Renaissance Computing Institute  
University of North Carolina at Chapel Hill

*Webinar: Engaging with CI Compass 02/07/2022*

# MAJOR MULTIUSER FACILITIES ENABLING BASIC RESEARCH



## NSF Major Facilities

Major Facilities rely on complex **cyberinfrastructure (CI)** to transform raw data into more interoperable and integration-ready data products

# Mission



CI Compass provides **expertise and active support to cyberinfrastructure practitioners at NSF Major Facilities in order to accelerate the data lifecycle** and ensure the integrity and effectiveness of the cyberinfrastructure upon which research and discovery depend.



PI: Ewa Deelman,  
USC



CI Compass  
Team



## Deep expertise in several CI areas critical to the MFs

- Data management, data processing, visualization, archiving, semantic technologies
- Automation, resource management, workflows, sensors
- Networking, clouds, systems and infrastructure
- Large-scale CI deployment and operations, IdM
- Social science

## Experience in the management of CI projects

- Conceptualization, from design phase to the broad adoption
- Project Management and Evaluation
- Organizational science
- Communications & Outreach

## Highly collaborative, strong history of working together

- Many diverse community connections in astronomy, earth science, physics

## Dedicated to the advancement of CI for science, engineering, and education



# Advisory Committee



Stuart Anderson  
*Caltech*



Adam Bolton  
*Aura/NoirLab*



Bonnie Hurwitz  
*University of Arizona*



Miron Livny  
*University of Wisconsin-Madison*



Von Welch  
*Indiana University*



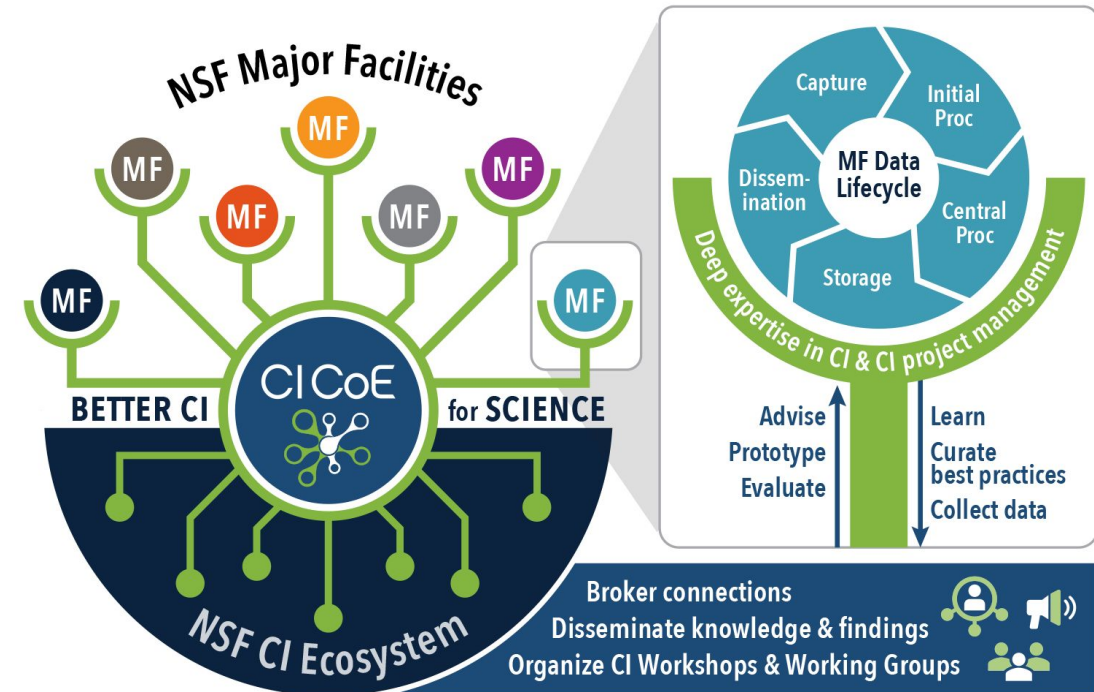
Michael Zentner  
*San Diego Supercomputer Center*



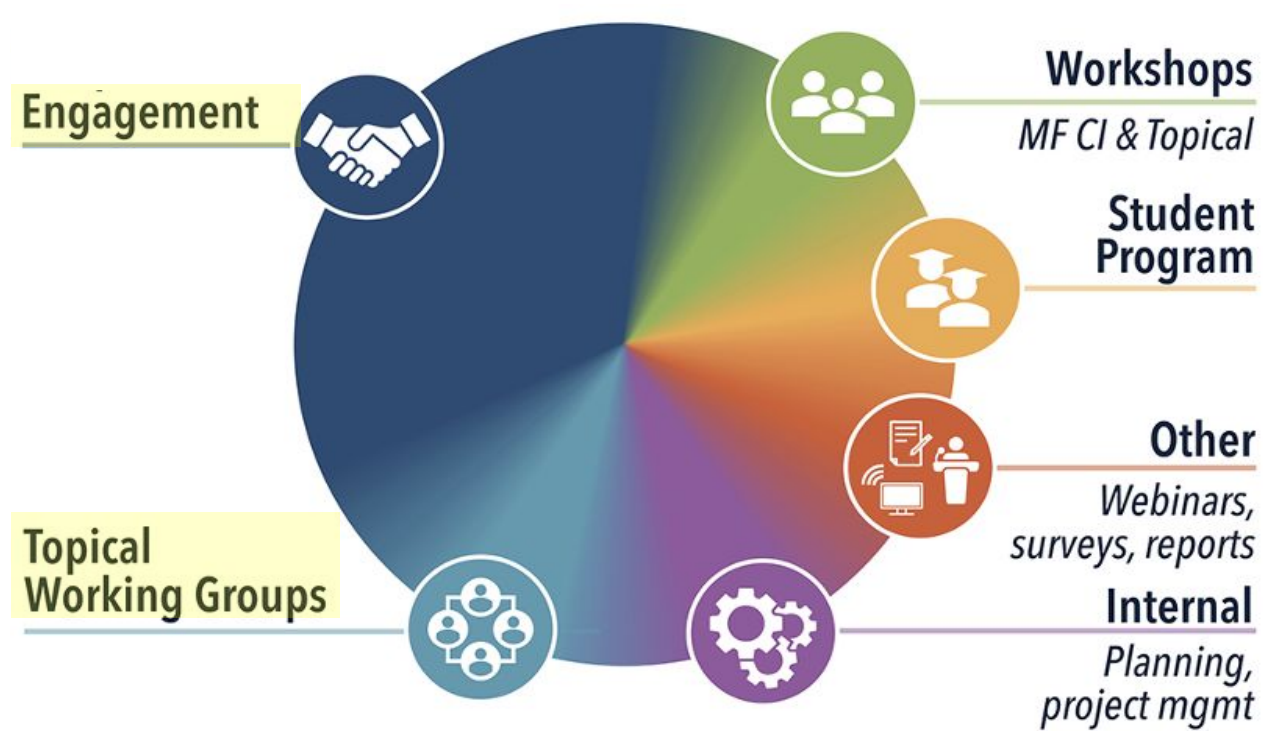


# Overall CI Compass Strategy

1. Recognize the expertise, experience, and mission-focus of Major Facilities
2. Contribute knowledge and expertise to the MF Data Lifecycle (DLC) CI and enhance the overall NSF CI ecosystem
3. Build expertise, not software - Leverage existing knowledge, tools, community efforts
4. Build partnerships to leverage community expertise
5. Broker connections and share knowledge, lessons learned, best practices with MFs, Partners, CI community



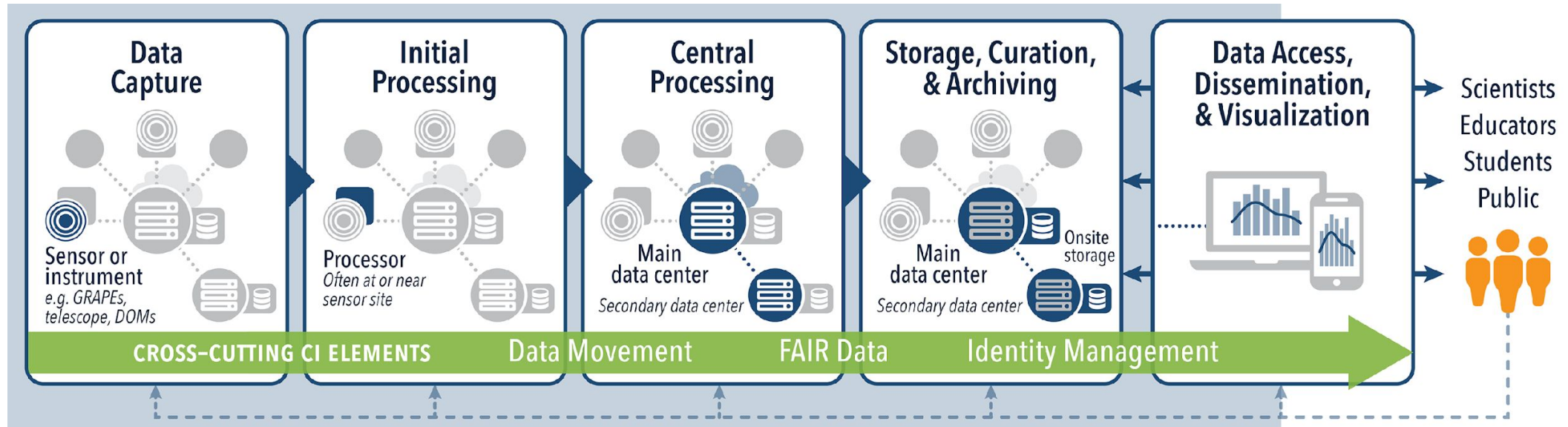
# CI Compass activities: Engagements



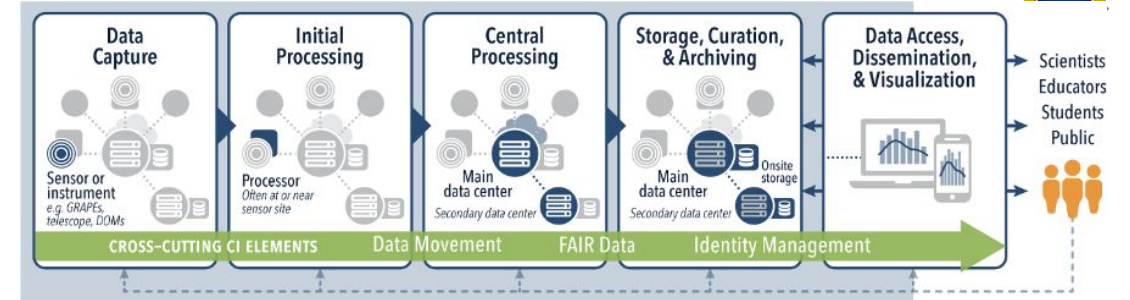
1. Data Lifecycle CI services offered to MFs for Engagement (**What can we help with ?**)
  - Examples of ongoing and past engagements conducted by the team
2. CI Compass Engagement (**How will we help ?**)



## Major Facilities Data Lifecycle – CI Compass Focus for Engagements



# CI Compass services



*Evaluate CI Plans, Help Design New Solutions, Develop Proofs of Concept,  
Assess Applicability/Performance of Existing Solutions, Help Leverage CI Solutions*

**Data Capture:** Discuss sensor data annotations, help apply community sensor data models to the MFs data, explore messaging systems, support interoperability across MFs, and connect to industry standards and to similar communities of practice within scientific domains.

**Central Processing:** Help leverage existing testbeds to evaluate new software stacks and configurations during CI design/enhancements.

**Data access, dissemination & visualization:** Assist in designing data visualization solutions (tools, formats, proofs of concept, etc.) for enhancing data discoverability and accessibility.

**Identity management:** Assist in developing IdM solutions for managing user data access to data, help in using IdM for data usage reporting and tracking.

Examples of services

Offered services' list (non-exhaustive) is published on CI Compass website:  
[https://ci-compass.org/assets/453214/cicompass\\_services\\_table.pdf/](https://ci-compass.org/assets/453214/cicompass_services_table.pdf/)

# Examples of Engagements

## NCAR Modeling with NEON Data [Nov 2020 - ...]

**Project goal:** Combine NEON ecosystem data with NCAR modeling capabilities to enable new discoveries; Use cloud technologies to enable data modeling and wide community access.

**CI Compass:** Provide advice on cloud technologies, including containers; Hands-on-help with container testing; Consult on FAIR aspects of data management; Provide advice on data visualization with proofs of concept;

### Current Working Groups (WGs):

1. *Data Exchanges*
2. *Container/Cloud Computing*
3. *Data Visualization*

<https://www.neonscience.org/ncar-neon-community-collaborations>

**NCAR** **neon**

National Ecological Observatory Network

[Data & Samples](#) / [Data Portal](#) / [Prototype Datasets](#) / f7acdef-e1e6-99c2-4de3-ecb2718cf185

NCAR-NEON Data CI Pilot. ABBY. 2018-2021

FIELD SITE

Abby Road NEON / ABBY

Relocatable Terrestrial, WA, D16: Pacific Northwest



DOI [10.48443/m9ez-fy80](#)

Version

v1

Time Range

2018 - 2021

Uploaded

September 8, 2021

Data Themes

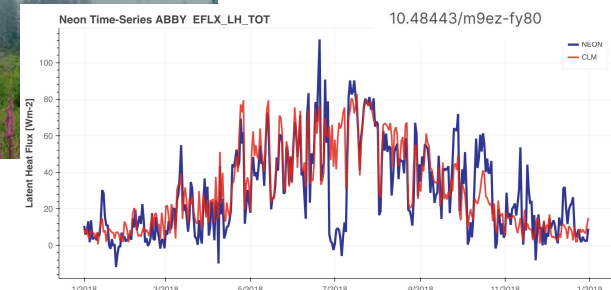
[Data Themes](#)

Time-series of  
Daily average  
Latent Heat Flux  
at ABBY

This interactive figure  
compares the daily  
average Latent Heat Flux  
[W/m<sup>2</sup>] at NEON's Abby  
Road site with CLM

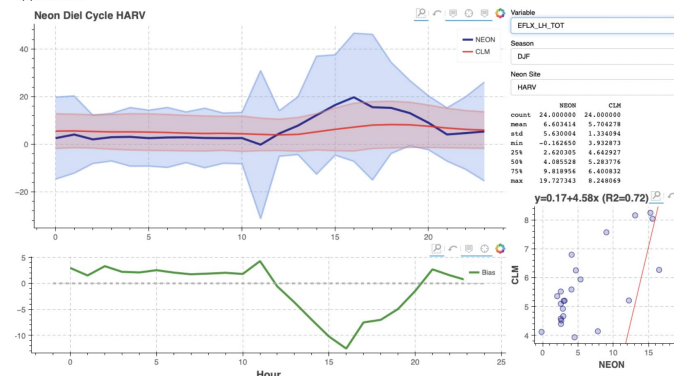
DOI [10.48443/m9ez-fy80](#)

10.48443/m9ez-fy80



bokeh\_script folder:

Includes the stand-alone script for running the diurnal cycle outside the notebook: to show case stand-alone application.



**NCAR-NEON  
community  
workshop on  
11/09/21**



# Examples of Engagements

## SAGE/GAGE Common Cloud Platform (CCP) [Feb 2020 - ...]



**Project goal:** Develop a Common Cloud Platform (CCP) for ingestion, archiving, curation, processing, and distribution of their data in a cloud environment in support of the combined GAGE/SAGE data services facility serving geodetic and seismic communities.

Engagement Phase 1 WGs	Engagement Phase 2 WGs	Engagement Phase 3 WGs
<ul style="list-style-type: none"> <li>• Data Flows and Use Cases,</li> <li>• Concept of Operations,</li> <li>• High-level Requirements,</li> <li>• Platform Design</li> </ul>	<ul style="list-style-type: none"> <li>• Data Collection,</li> <li>• Data Archiving,</li> <li>• Data Distribution,</li> <li>• Cloud Provider Analysis,</li> <li>• Process Orchestration,</li> <li>• Identity Management</li> </ul>	<ul style="list-style-type: none"> <li>• GeoCrate Common Data Container/Framework,</li> <li>• Metadata Handling System,</li> <li>• Prototype System in Commercial Cloud</li> </ul>

**CI Compass** : Provide advice on different WG areas related to their DLC; Review system design and performance limitations; Conduct research into and documentation of CI best practices for CCP architecture design; Co-design architectural documents and solutions for data access, data ingest and processing, migration, storage tiering, and archiving. Observe, learn, and document a complex MF CI migration into Cloud and institutional merge process.



## REVIEW OF **COST/RISK/BENEFIT ANALYSIS**

- Is there a reasonable solution for an affordable cost?



Jarek Nabrzyski,  
Notre Dame,  
CI Compass

## GAGE/SAGE 2021 COMMUNITY SCIENCE WORKSHOP

Revealing Earth Systems: Integrating Spatial and Temporal Data



Last Edited: 09/20/2021

### ■ **CCP Provider Analysis Project Overview** SAGE/GAGE & CI Compass

Jarek Nabrzyski (CI CoE lead), Rick Benson (IRIS PoC), Chad Trabant (SAGE/GAGE integration project lead), Scott Hampton (ND CRC), David Mencin (UNAVCO), Jerry Carter (IRIS), Mary Gohsman (ND CRC), Ewa Deelman (CI CoE PI), Wendy Whitcup (CI CoE PM), Doug Ertz (UNAVCO).

Distribution: Release to SAGE/GAGE and CI Compass Personnel Only

# Examples of Engagements

## NEON CI Enhancements [2018 - 2019]

Learn about MFs (operations, enhancements);  
Understand how a CI CoE can help with planned  
CI enhancements for NEON; Inform the model  
for a CI CoE

### CI CoE Pilot:

- Addressed issues related to sensor data collection and processing
- Helped with NEON data annotation and discovery
- Helped visualize AOP data
- Helped design an IdM solution
- Learned about the NEON Data Lifecycle and the CI that supports it



The CI CoE had four types of profound influence on NEON developers. First, as we transitioned from construction to operations, our developers benefited from greater awareness of the wider NSF CI community practices.

Second, deep engagement with CI CoE experts produced three major technologies insertions into NEON CI remarkably within 6 months

Third, open dialog and prototyping with CI CoE experts affirmed our workflow-based sensor message handling strategy and built our confidence to invest in this novel method. NEON's CI and Data Sciences team mission includes advancing methods and ecological science; interaction with CI CoE nudged our efforts ahead significantly through community workgroup involvement, presentations and publications.

– Tom Gulbransen, NEON

**Products: software prototypes, documents, schema designs, presentations, videos, publications**

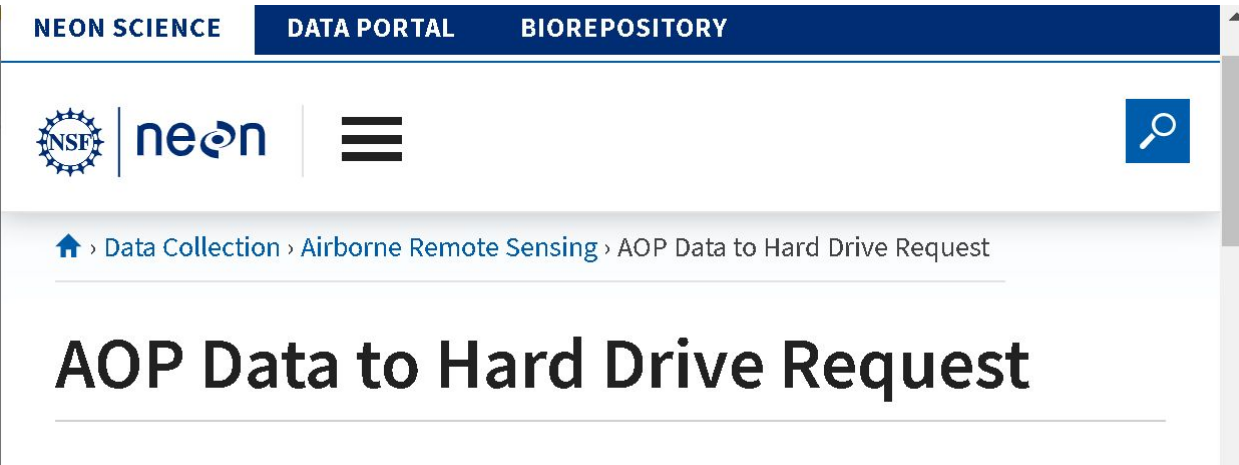


# Data Presentation – New interactive data access



Steve Petruzza, Utah

**Before**



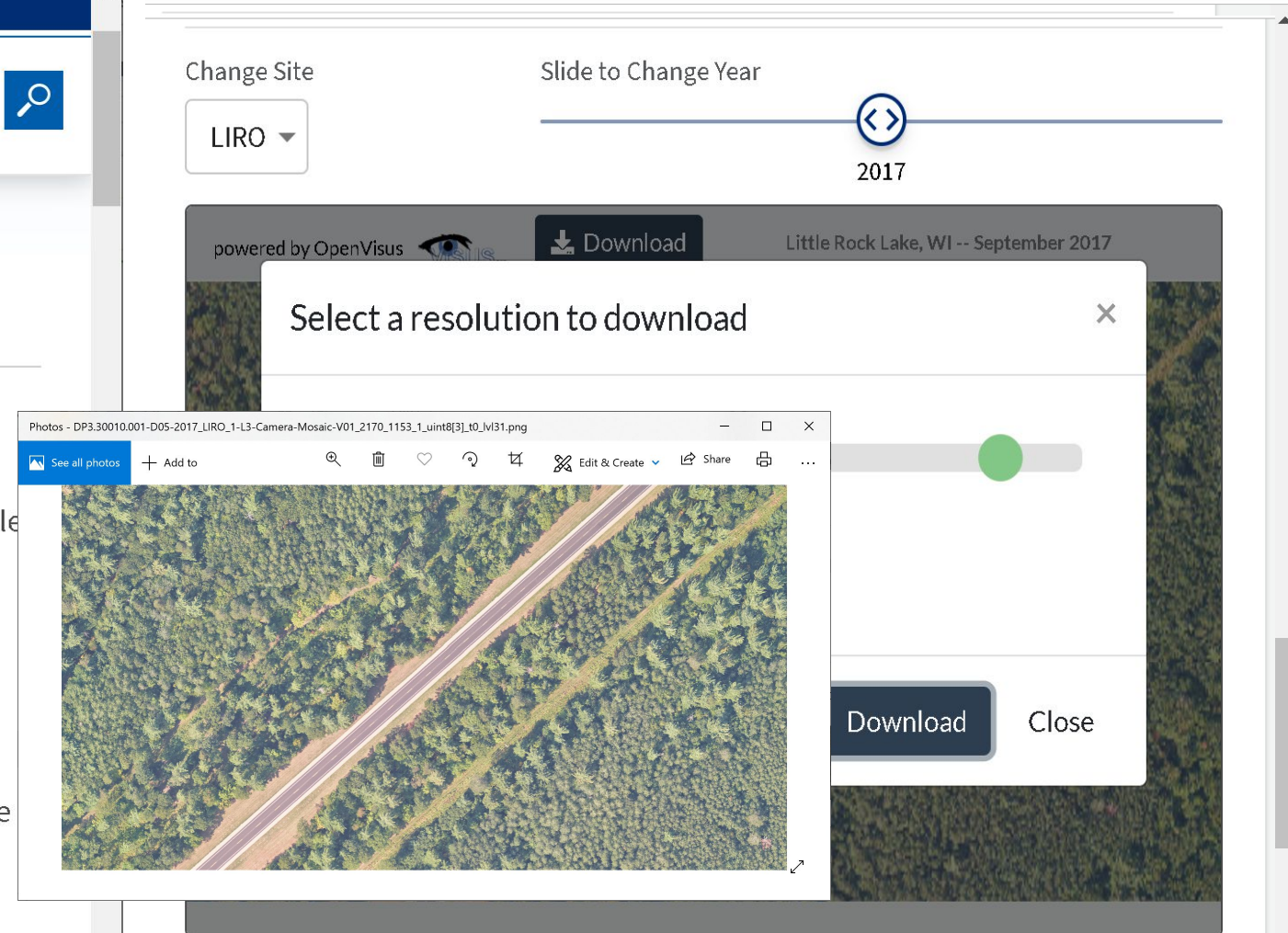
## AOP Data to Hard Drive Request

There are several ways, users can access airborne data:

- Download the data from the [NEON data portal](#) (recommended for smaller amounts of data)
- Programmatically access the data with the [NEON Data API](#) or using the [NEON Utilities](#) GitHub repo (>1 GB downloads)
- Mail in a hard drive to receive your data

Please fill out the form below if you are interested in receiving a hard drive of AOP data, and we will respond with a recommended hard drive size as well as mailing instructions.

**After**



Working group	Goals	Products
<b>Data Capture</b>	Develop demonstrators and comparisons of the multiple architectures for data capture at the sensor to data deposition in a repository	<ul style="list-style-type: none"> <li>•<b>Proof of Concept:</b> architecture demo on github: <a href="https://github.com/cicoe/SensorThingsGost-Balena">https://github.com/cicoe/SensorThingsGost-Balena</a></li> </ul>
<b>Data Processing</b>	Provide support and distill best practices for workflows and services related to the processing of data.	<ul style="list-style-type: none"> <li>•<b>Paper:</b> "Exploration of Workflow Management Systems Emerging Features from Users Perspectives" (Workshop on Big Data Tools)</li> </ul>
<b>Data Storage, Curation, &amp; Preservation</b>	Compare and be able to consult on different data storage, curation and preservation technologies.	<ul style="list-style-type: none"> <li>•<b>Document:</b> Competency questions based on scenarios that domain experts may use Google dataset search for NEON dataset discovery</li> <li>•<b>Presentation:</b> at ESIP on schema.org</li> <li>•Small containerized <b>prototype</b> of publishing neon vocabularies as linked data and linked data connection</li> </ul>
<b>Identity Management</b>	Understand current practice in authentication and authorization and help mature practice across the NSF Large Facilities.	<ul style="list-style-type: none"> <li>•<b>Production deployment:</b> Connection to CI Logon NEON data download (using existing university / organization credentials) <a href="https://cert-data.neonscience.org/home">https://cert-data.neonscience.org/home</a></li> <li>•<b>Paper:</b> <a href="#">NEON IdM Experiences</a> (NSF Cybersecurity Summit)</li> </ul>

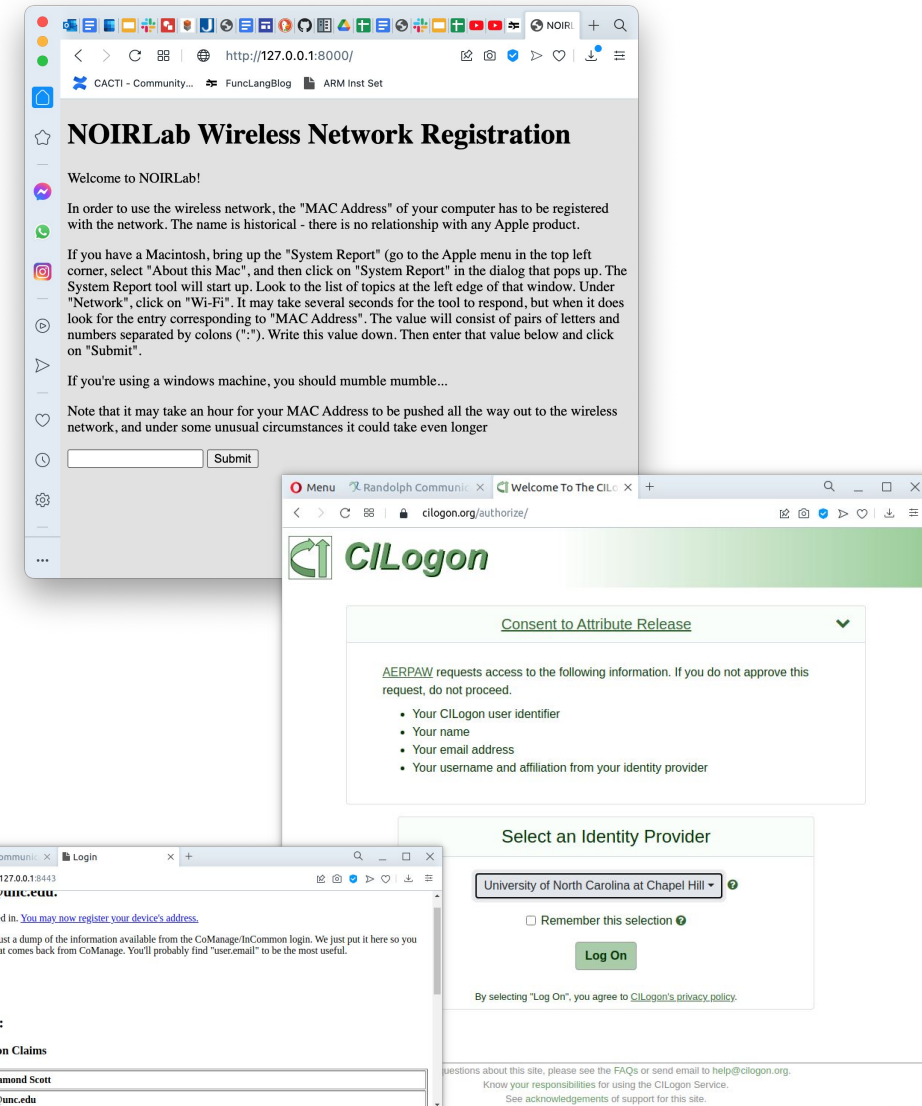
# Examples of Engagements

## NOIRLab Identity Management [Sep 2021 - Feb 2022]

**Project goal:** Assist NOIRLab to integrate InCommon external identities for NOIRLab

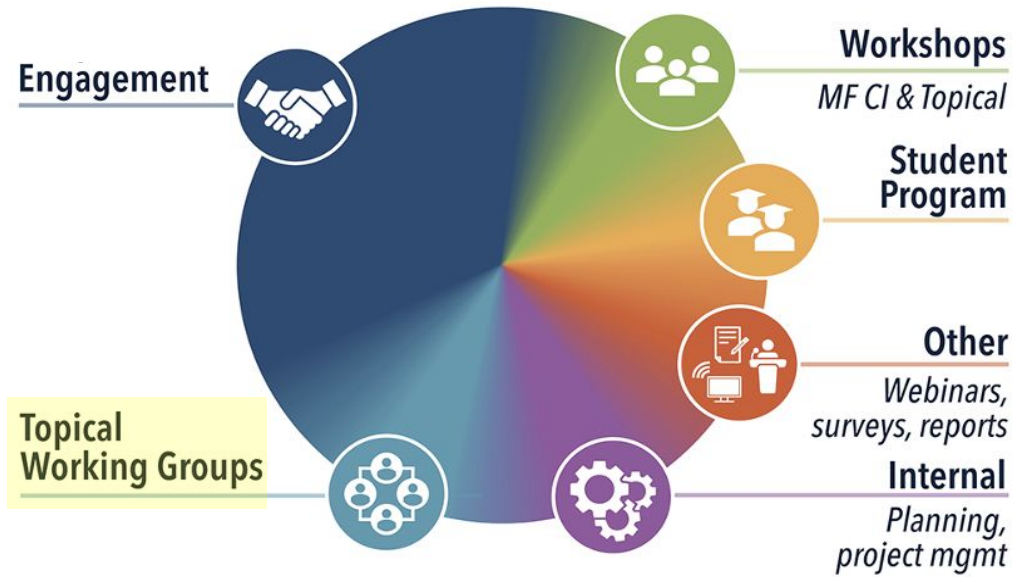
### CI Compass:

- Advise NOIRLab on use of federated identity management through InCommon using CILogon and CoManage or other mechanisms
- Produce and share examples of solving identity and access problems suitable for both NOIRLab staff and for visiting scientists
- Research and share findings related to provisioning network access for InCommon-identified users





# CI Compass activities: Topical Working Groups



## Identity Management Topical WG (in Collaboration with Trusted CI)

Disseminate IdM information

- Quarterly meetings with speakers and discussions on topics relevant to MFs: e.g. CILogon
- Engagements, primarily focusing on federated identity management
- Issues of identifying data usage and enabling reporting

## Cloud Infrastructure Topical WG

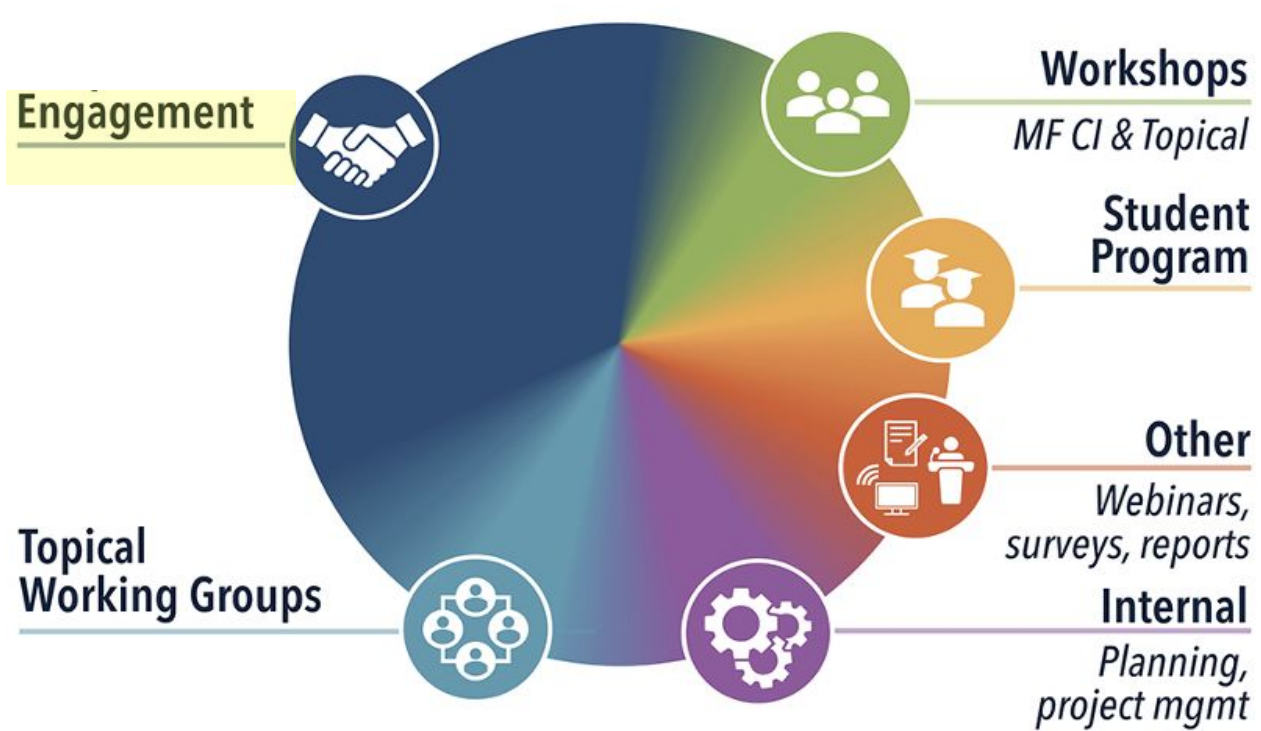
- Understand the current practices for clouds used by MFs
- Research alternative solutions and keep up to date with emerging cloud technologies
- Develop a general set of best practices that can inform the MFs

Send email to  
[engage@ci-compass.org](mailto:engage@ci-compass.org) to  
participate in any of these or  
future Topical Working Groups

# Quick Poll: Please respond on Zoom Chat

**If you had a magic wand, what CI problem would you solve, or what capability would you materialize?**

# CI Compass activities: Engagements



1. Data Lifecycle CI services offered to MFs for Engagement (**What can we help with ?**)
2. CI Compass Engagement (**How will we help ?**)



## Conducting an Engagement

- **Understand specific MF DLC CI needs and goals** with respect to selected engagement;
- **Learn** about the state of current CI and related challenges;
- **Provide expertise** and hands-on help (but not modify the MF CI directly) through advice (verbal and written) and prototyping, respectively;
- **Distill best practices** from the engagement and lessons learnt both by CI compass and the MF; and
- **Disseminate the generalizable knowledge** to other MFs, the broader CI community and to other appropriate technical and community forums

## How we work with MFs



Engagement Solicitation



Selection and Working Groups



Engagement Plan

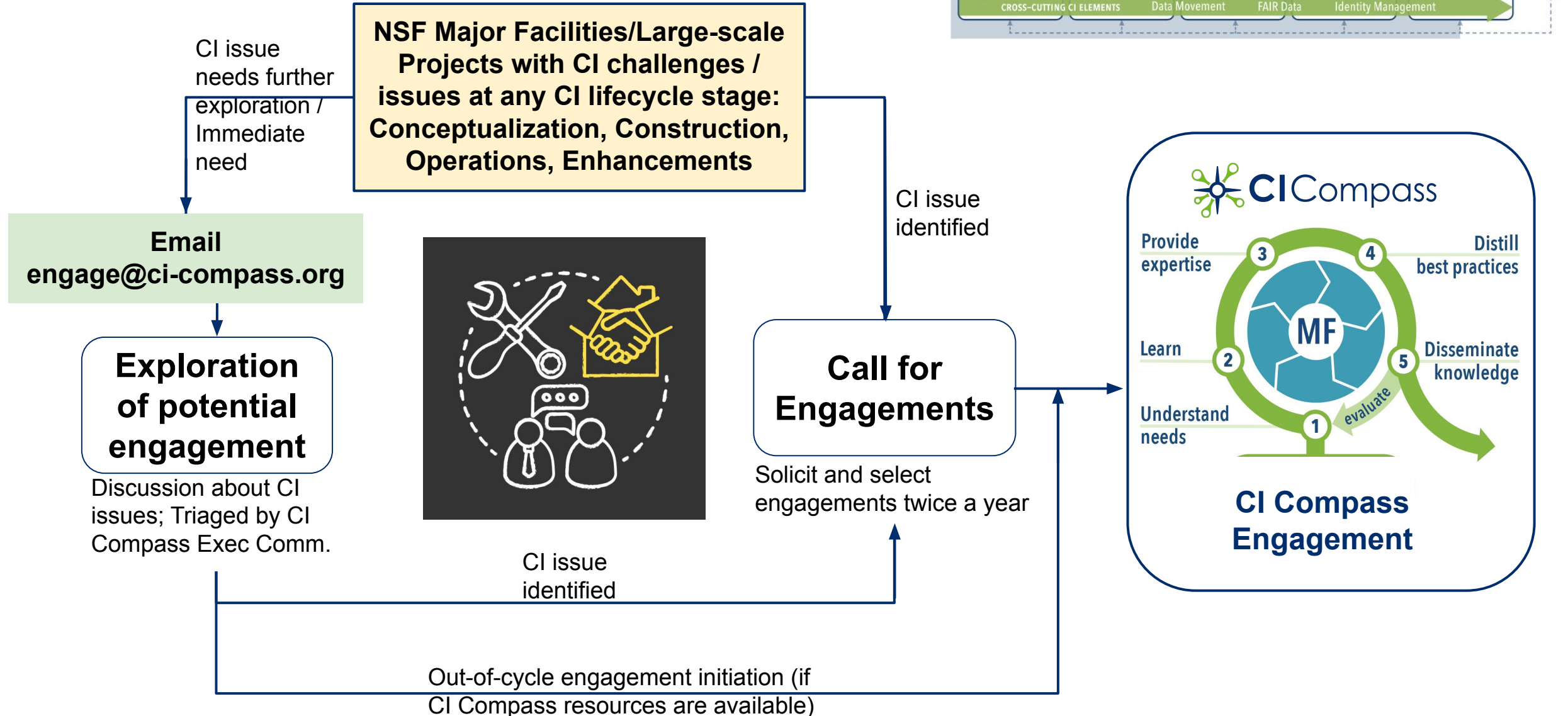


Work Products



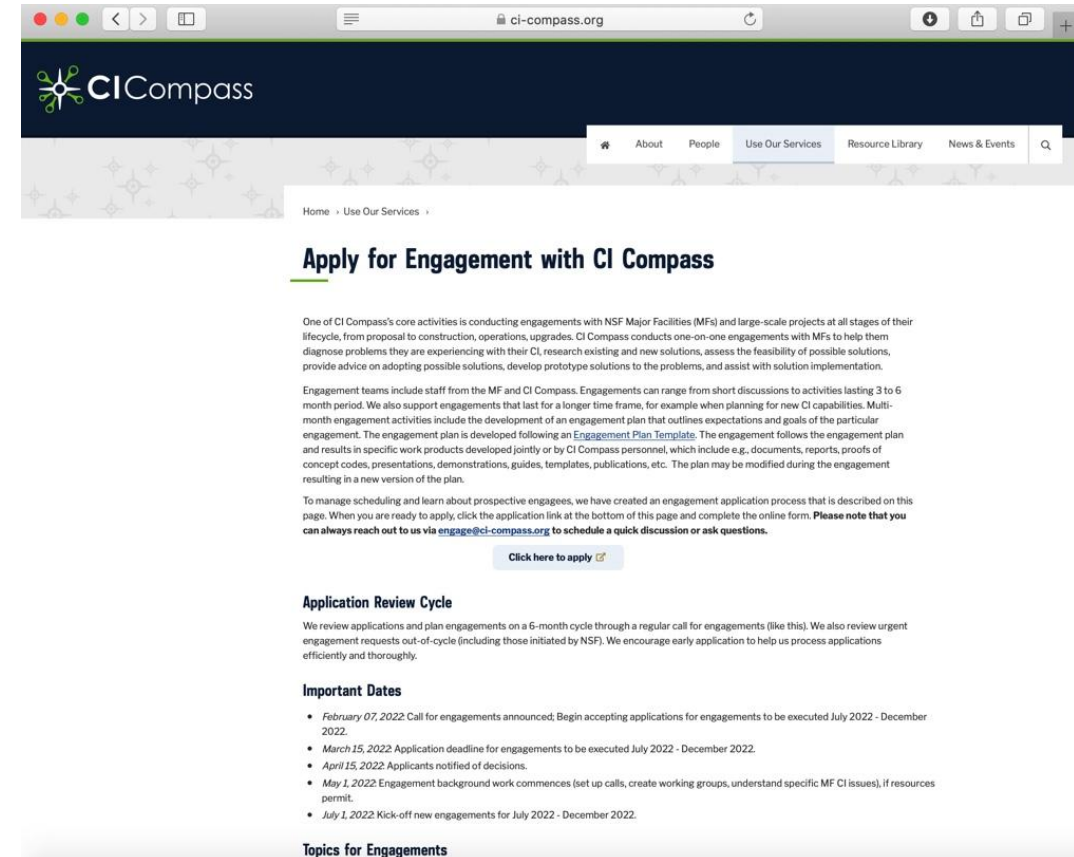
Evaluation

# How to engage with CI Compass ?



# Engagement solicitation

- **Exploration of potential engagements**
  - Email [engage@ci-compass.org](mailto:engage@ci-compass.org)
- **Call for Engagements**
  - Solicit applications from MFs for deep engagements on a **6 month** basis in Spring and Fall for each project year
  - Announcements about will be posted on the CI Compass website, email lists, social media, and sent to partner organizations, e.g. RICO (LFO)
- **Work with NSF** to identify MFs in need of CI expertise
  - Reach out to leadership at other NSF directorates that manage the different MFs
  - NSF can also request for discussions / engagements or reach out on behalf of projects in planning stages
- **Out-of-cycle requests**



<https://ci-compass.org/services/apply-for-engagement-with-ci-compass/>

# Selection of Engagements

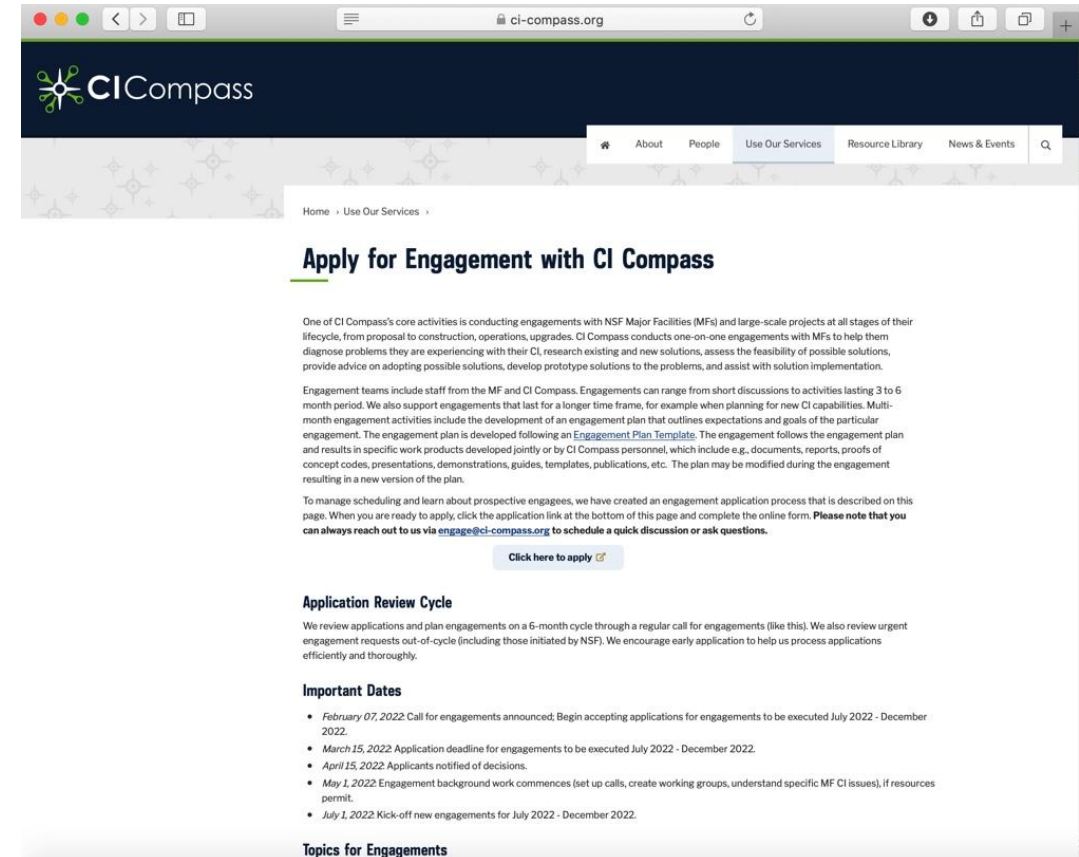
## • Selection Criteria

- **Intellectual merit:** the potential of the activity to improve the MF's CI; the degree to which the activity is likely to enable the MF to further their science goals, innovate, or advance their work.
- **Applicability:** the problem's fit within the overall scope of the Major Facility Data Lifecycle.
- **Feasibility:** availability of the CI Compass personnel (i.e., time and expertise); availability of the MF personnel involved in the engagement, and also the ability to follow through with CI Compass advice and assistance.

## • Application Review Process

- The CI Compass Executive Committee will review applications
- CI Compass will provide decisions within 1 month of the application closing date

## • Resource Allocation and Working Group Creation



The screenshot shows the CI Compass website with a dark blue header and a light blue navigation bar. The main content area is white with a pattern of small stars. The page title is 'Apply for Engagement with CI Compass'. The text describes the engagement process, including the review cycle and important dates. A button labeled 'Click here to apply' is visible. The footer contains the text 'Topics for Engagements'.

Home > Use Our Services >

### Apply for Engagement with CI Compass

One of CI Compass's core activities is conducting engagements with NSF Major Facilities (MFs) and large-scale projects at all stages of their lifecycle, from proposal to construction, operations, upgrades. CI Compass conducts one-on-one engagements with MFs to help them diagnose problems they are experiencing with their CI, research existing and new solutions, assess the feasibility of possible solutions, provide advice on adopting possible solutions, develop prototype solutions to the problems, and assist with solution implementation.

Engagement teams include staff from the MF and CI Compass. Engagements can range from short discussions to activities lasting 3 to 6 month period. We also support engagements that last for a longer time frame, for example when planning for new CI capabilities. Multi-month engagement activities include the development of an engagement plan that outlines expectations and goals of the particular engagement. The engagement plan is developed following an [Engagement Plan Template](#). The engagement follows the engagement plan and results in specific work products developed jointly or by CI Compass personnel, which include e.g., documents, reports, proofs of concept codes, presentations, demonstrations, guides, templates, publications, etc. The plan may be modified during the engagement resulting in a new version of the plan.

To manage scheduling and learn about prospective engagees, we have created an engagement application process that is described on this page. When you are ready to apply, click the application link at the bottom of this page and complete the online form. **Please note that you can always reach out to us via [engage@ci-compass.org](mailto:engage@ci-compass.org) to schedule a quick discussion or ask questions.**

[Click here to apply](#)

#### Application Review Cycle

We review applications and plan engagements on a 6-month cycle through a regular call for engagements (like this). We also review urgent engagement requests out-of-cycle (including those initiated by NSF). We encourage early application to help us process applications efficiently and thoroughly.

#### Important Dates

- February 07, 2022: Call for engagements announced; Begin accepting applications for engagements to be executed July 2022 - December 2022.
- March 15, 2022: Application deadline for engagements to be executed July 2022 - December 2022.
- April 15, 2022: Applicants notified of decisions.
- May 1, 2022: Engagement background work commences (set up calls, create working groups, understand specific MF CI issues), if resources permit.
- July 1, 2022: Kick-off new engagements for July 2022 - December 2022.

#### Topics for Engagements

<https://ci-compass.org/services/apply-for-engagement-with-ci-compass/>

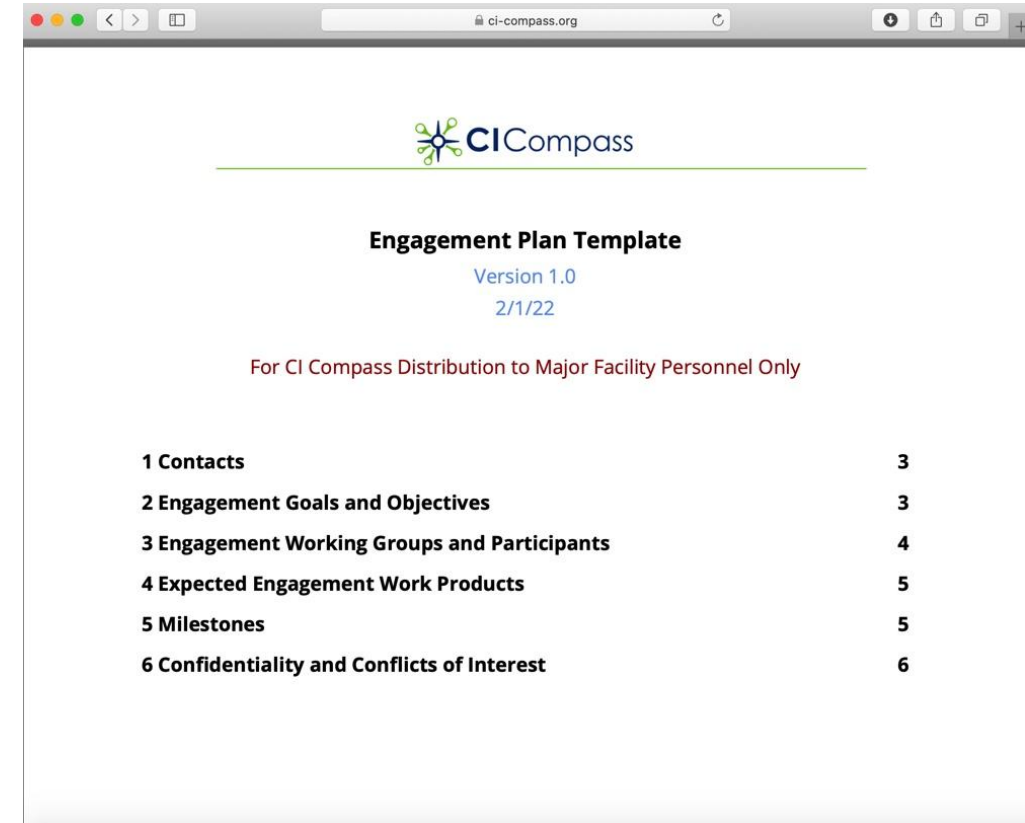


# Engagement Plan

Engagements lasting more than one month will be documented using an **engagement plan**

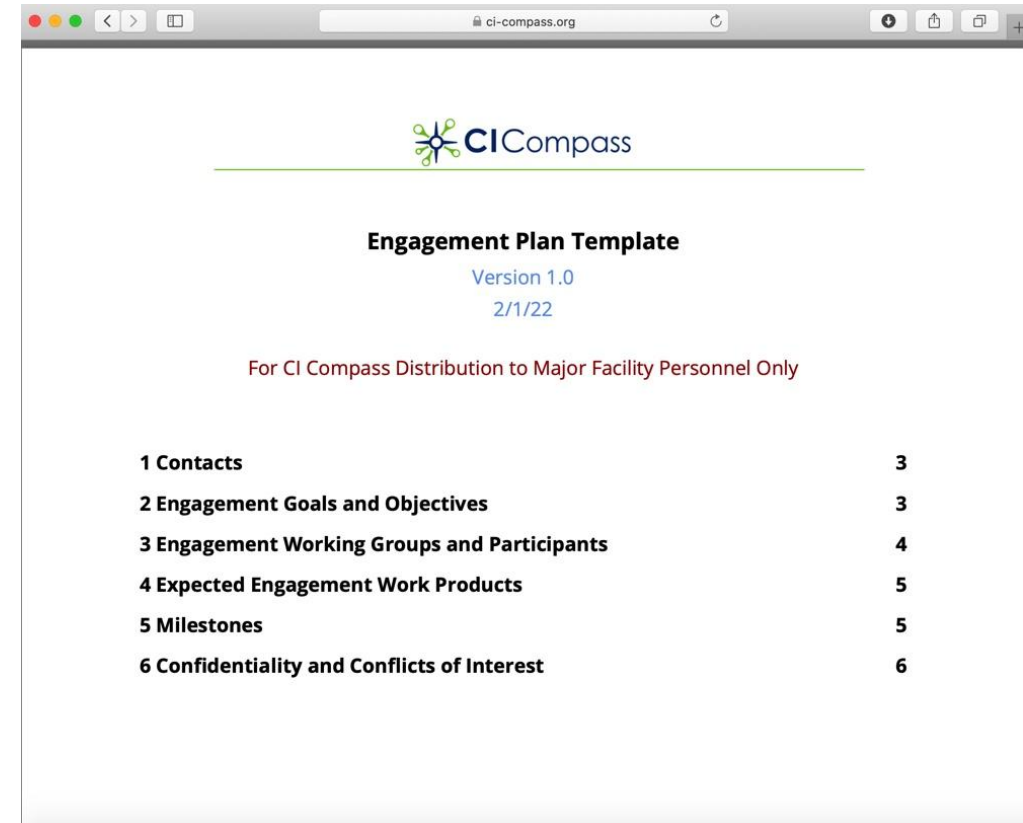
Engagement plan will be adapted from a CI Compass engagement plan **template**

- *Engagement scope, goals, timeframe, and specific objectives;*
- *Engagement Working Groups and Participants for CI Compass and the MF involved;*
- *Expected engagement work products;*
- *Milestones*




# Engagement Plan

- If more than one CI topic is addressed in an engagement, multiple working groups (WG) will be created
  - **CI Compass lead** and **MF lead** for each WG
  - Defined work products and milestones for each WG
- Engagement plan to be approved
  - by CI Compass leads and the MF leads for each working group
  - within 1 month of the start of the engagement.



The screenshot shows a web browser window displaying the CI Compass Engagement Plan Template. The browser address bar shows 'ci-compass.org'. The document header includes the CI Compass logo and the title 'Engagement Plan Template' with 'Version 1.0' and '2/1/22' below it. A red line of text states 'For CI Compass Distribution to Major Facility Personnel Only'. The table of contents lists six sections with their corresponding page numbers.

 <b>CI Compass</b>	
<b>Engagement Plan Template</b>	
Version 1.0	
2/1/22	
For CI Compass Distribution to Major Facility Personnel Only	
<b>1 Contacts</b>	<b>3</b>
<b>2 Engagement Goals and Objectives</b>	<b>3</b>
<b>3 Engagement Working Groups and Participants</b>	<b>4</b>
<b>4 Expected Engagement Work Products</b>	<b>5</b>
<b>5 Milestones</b>	<b>5</b>
<b>6 Confidentiality and Conflicts of Interest</b>	<b>6</b>

## Evaluation of Engagements

- All engagement activities and products created by the CI Compass team will be **reviewed by the Evaluator**
- The Evaluator will collect and analyze two types of information:
  - ***Statistics on engagement work products generated by CI Compass and usage of CI Compass work products*** - internal and external products created (e.g., documents, reports, proofs of concept, presentations), work products generalized (guides, templates, publications), materials used (e.g., views, downloads, followers, likes, comments).
  - ***Qualitative feedback (e.g., surveys, email questionnaire) from MFs about their experiences using CI Compass services or participating in CI Compass activities.***  
Feedback taken within 3 months or quarterly.



**CI Compass  
Engagement**



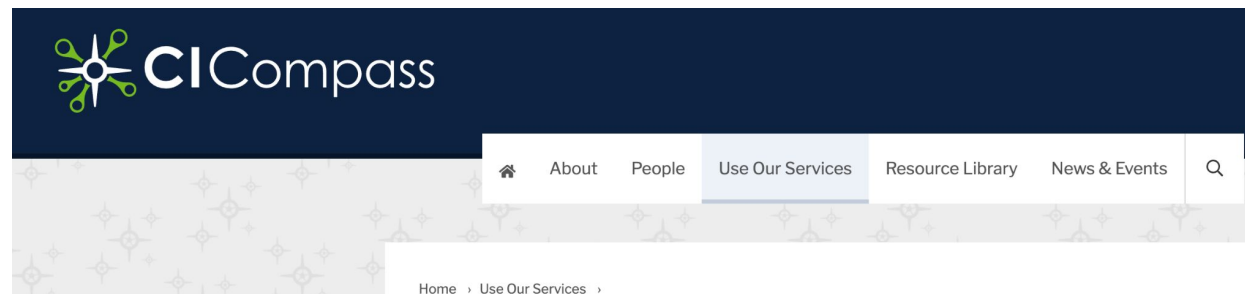
# Let's Work Together

To explore potential opportunities for an engagement with CI Compass regarding a CI issue you might have, please email

[engage@ci-compass.org](mailto:engage@ci-compass.org)

To respond to our **Call for Engagement**, please click the following link:

<https://ci-compass.org/services/apply-for-engagement-with-ci-compass/>



## Apply for Engagement with CI Compass

One of CI Compass's core activities is conducting engagements with NSF Major Facilities (MFs) and large-scale projects at all stages of their lifecycle, from proposal to construction, operations, upgrades. CI Compass conducts one-on-one engagements with MFs to help them diagnose problems they are experiencing with their CI, research existing and new solutions, assess the feasibility of possible solutions, provide advice on adopting possible solutions, develop prototype solutions to the problems, and assist with solution implementation.

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## CI Compass Engagement



# Thank You !!!

## Online Presence

To learn more about CI Compass services, leadership, news, upcoming events and our resource library, please visit [ci-compass.org](https://ci-compass.org)

Contact the CI Compass Team with questions or requests by emailing

[contact@ci-compass.org](mailto:contact@ci-compass.org)

## Connect on social media

### Twitter

Follow [@CICompass](https://twitter.com/CICompass)

### LinkedIn

Connect with us

[linkedin.com/company/ci-compass](https://linkedin.com/company/ci-compass)

### YouTube

Subscribe to our channel

[CI Compass](https://www.youtube.com/channel/UCICompass)