

From the Desktop to the Cloud

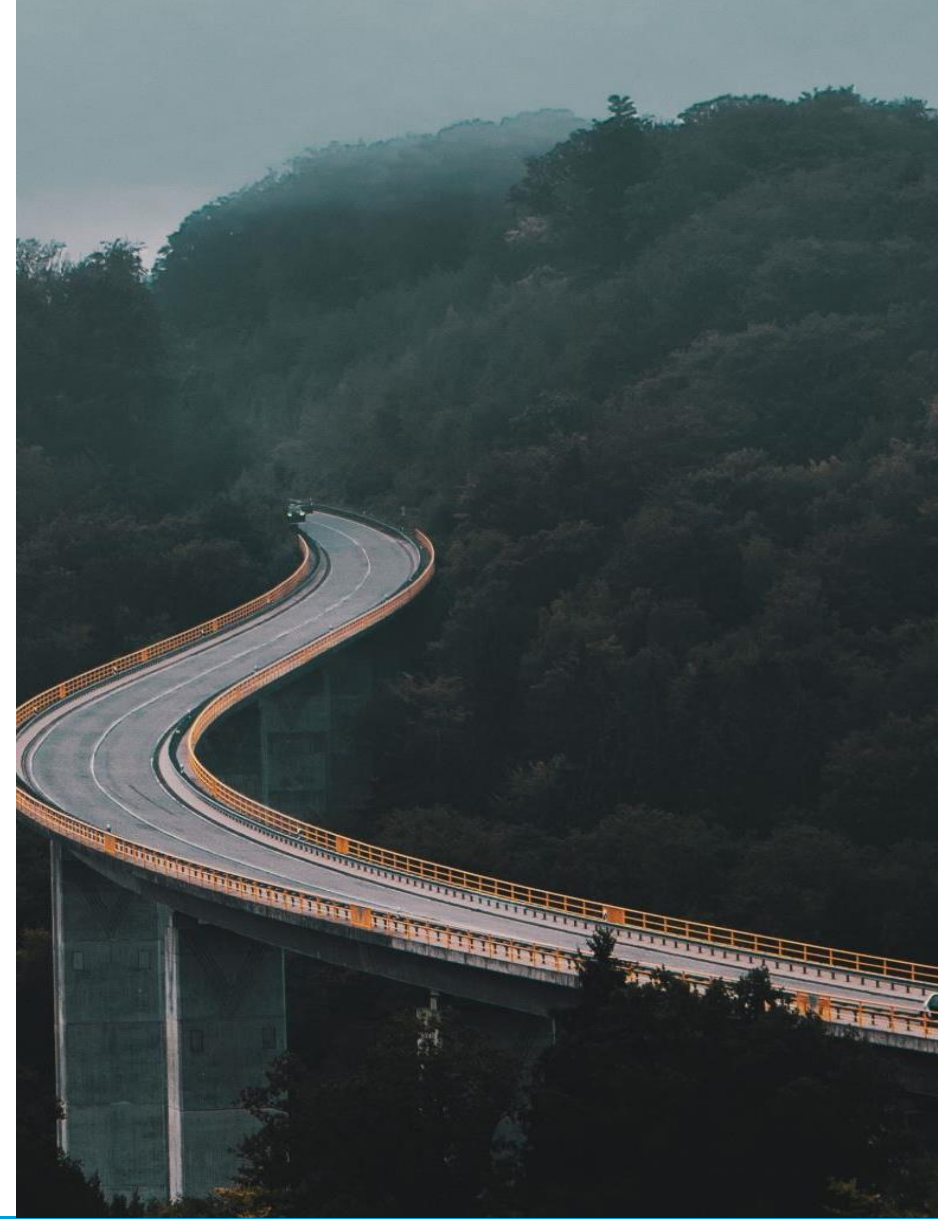
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AASHTOWare RADBUG
August 8, 2023



Outline

- History
- Where are we now?
- Why leverage the cloud?
- Our vision...
- What's next?
- Questions?



History



- Early History

- Project initiated in 1994
- First release in 1999
- First version developed in PowerBuilder
- Subsequent versions developed in MS Visual C++/COM MFC
- Developed as a desktop “client-server” application



History – Virtis/Opis - User Group - 2000



ProMiles®

2000 VIRTIS/OPIS/BRASS USERS GROUP PRELIMINARY AGENDA
July 13 – 15, 2000

Time	Topic	Presenter	Group
8:30	Welcome & Introductions		
9:00	Brass Administrative Update (status of BRASS releases, how users can get updates and technical help, BRASS development, funding, and future direction)	MNDOT Mike Watters	B/V/O BRASS
10:00	BRASS Survey Results on Enhancement Priorities (items from the survey that have been started and/or completed)	Mike Watters	B/V/O
11:00	Recent Maintenance, Modifications and Enhancements for BRASS-GIRDER	Dan Glandt	B/V/O
11:30	Recent Maintenance, Modifications and Enhancements for BRASS-GIRDER(LRFD)	Jay Puckett or Brian Goodrich	B/V/O
12:00	Lunch	All	
1:00	BRASS-GIRDER(LRFR) Development Efforts	Jay Puckett or Brian Goodrich	B/V/O
1:30	Prestressed Girder Analysis and Rating Verification & Ongoing NCHRP Testing efforts (Comparisons using BRASS-GIRDER and PennDOT's analysis programs)	Jay Puckett or Brian Goodrich	B/V/O
3:00	Update on BRASS-CULVERT and BRASS-CULVERT (LRFD) (development and alpha and beta testing)	Mike Watters	BRASS
3:30	BRASS-PIER (LFD and LRFD) Maintenance and Development Efforts	Jay Puckett or Brian Goodrich	BRASS
4:15	Steel Bridge Rehabilitation Using BRASS	Ron Pierce	BRASS
4:45	PCI Example Verification Using BRASS	William Dooley	BRASS
Friday	Virtis/Opis Update		
8:30	NY DOT implementation of Virtis	Jim Duray	V/O
9:30	New features in VIRTIS/OPIS Release 3.0	Brian McCaffrey	V/O
10:00	New features coming in VIRTIS/OPIS Release 4.0	Jim Duray	V/O
10:30		Jim Duray	V/O

2000 VIRTIS/OPIS/BRASS USERS GROUP PRELIMINARY AGENDA



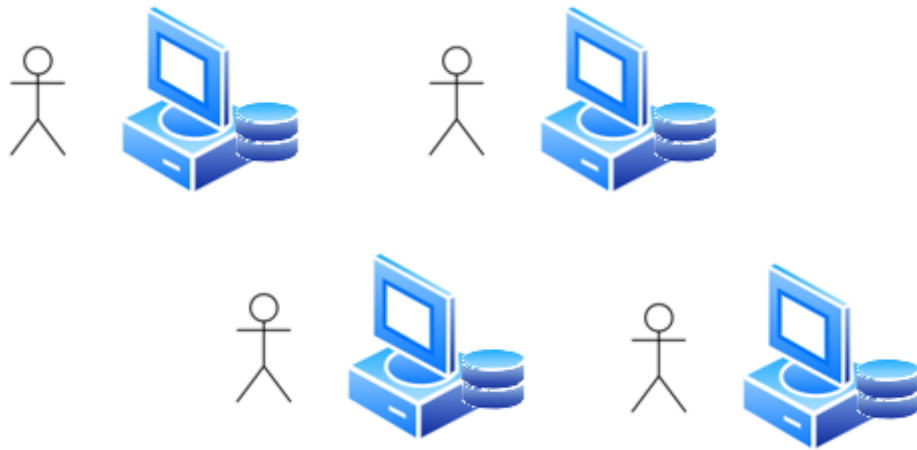
History – Virtis/Opis - User Group - 2000

Time	Topic	Presenter	Group
	<i>July 13 – 15, 2000</i>		
11:00	Virtis Opis ReportWriter	Jim Duray	V/O
11:30	VIRTIS OPIS Release 3.0 Training Example	Jim Duray or Brian Goodrich	B/V/O
	Lunch	All	V/O
12:00	VIRTIS OPIS Release 3.0 Training Example	Jim Duray or Brian Goodrich	V/O
1:00	VIRTIS OPIS Support Center (user comments and recommendations)	Jim Duray	V/O
1:30	VIRTIS OPIS Substructure Status	Jim Duray	V/O
3:30	Using VIRTIS OPIS with an Oracle Database	Jim Duray	V/O
3:45	Structure of Oracle Database	Jim Duray	V/O
4:15			V/O/B
Saturday	Panel Discussion		V/O/B
8:30	VIRTIS OPIS BRASS business & election of officers		

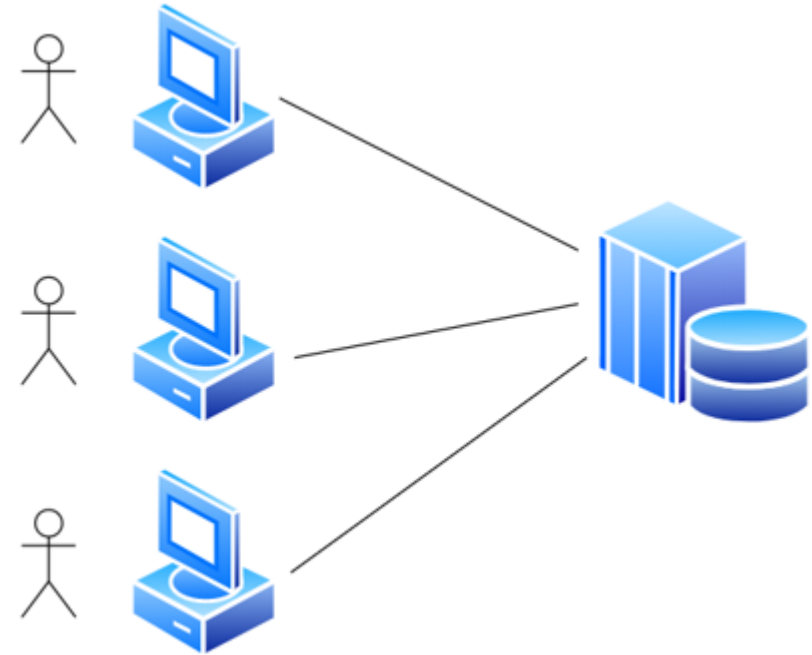


History

- Original/Current Architecture



Local Database



Centralized Database

History

- Modernization
 - Process started in 2012/2013
 - Held workshop with stakeholders
 - Determined new architecture
 - Have ability to support future service-based architecture (cloud)
 - Move away from C++/COM and modernize to .Net Framework
 - Started development April 2016
 - Completed in January 2021



Where are we now?

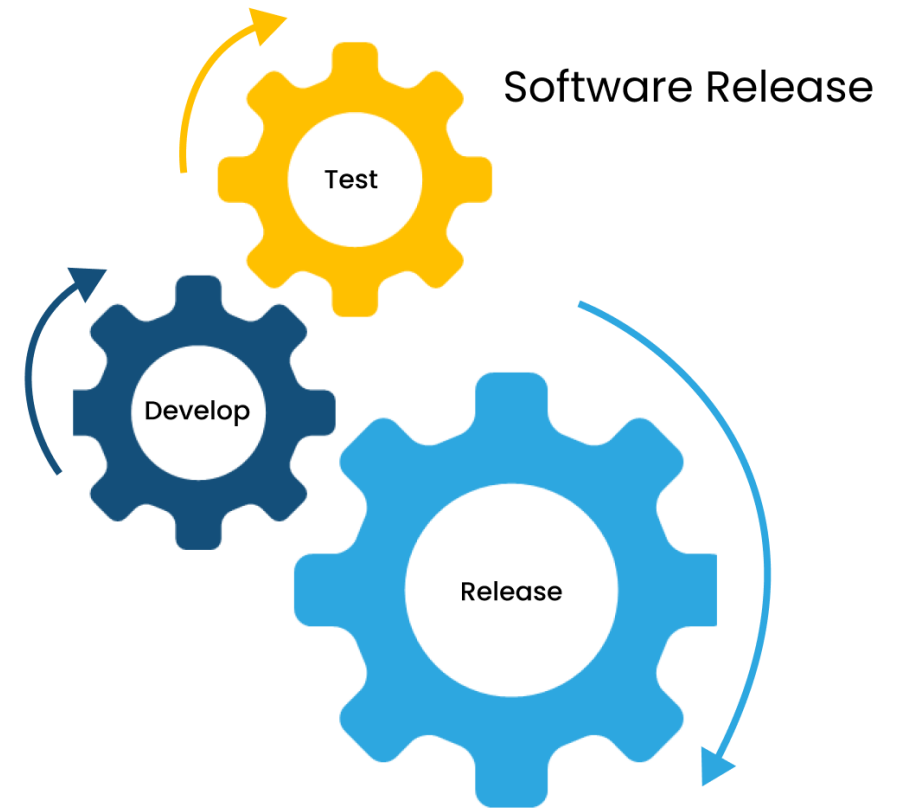


- Using modern technology
- More extensible and maintainable
- Analysis API rating more flexible and powerful (useful for automated permitting)
- Better 3rd party support (and future support)
- Catching up on backlog
- Adding new structure types and features
- Preparing for addition of cloud services

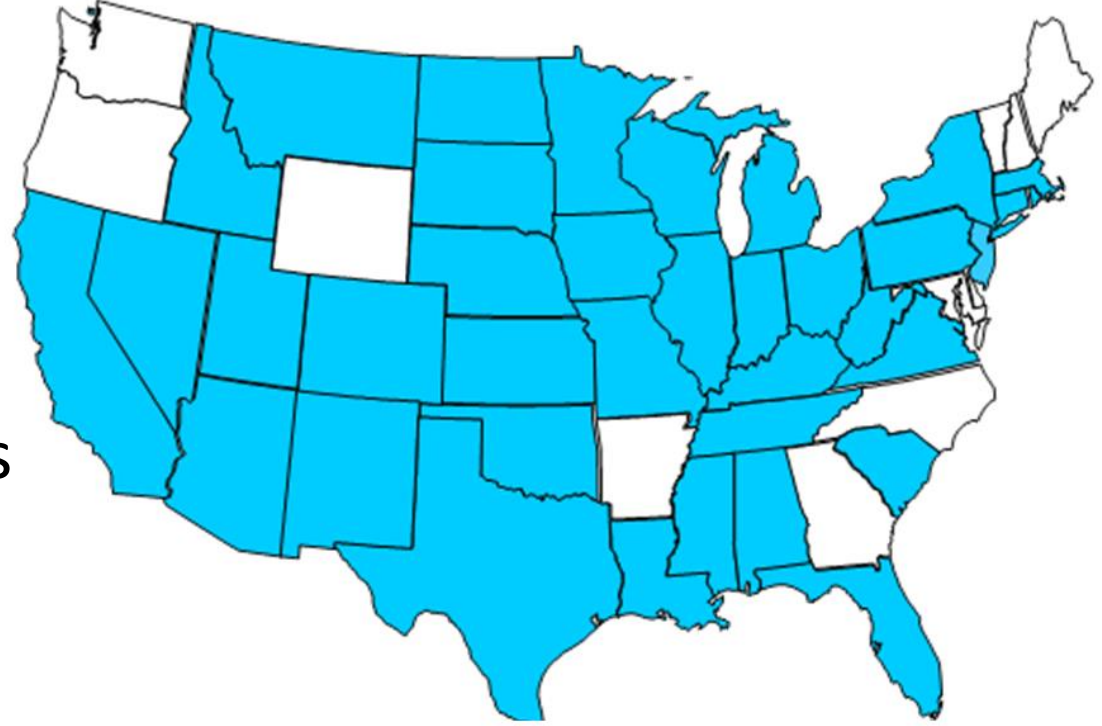


Where are we now?

- 9 releases since modernization ended
 - 5 Major Versions: 7.0 (2021), 7.1 (2021), 7.2 (2022), 7.3 (2022), 7.4 (2023)
 - 2 Minor Versions: 7.1.1 (2021), 7.3.1 (2022), 7.3.2 (2023), 7.4.1 (2023)
- Goal is to have 2 releases per fiscal year
 - Major and/or minor releases
- More releases doesn't mean you have to upgrade every release!



Where are we now?



- 39 state agencies license
- 4 new state agencies since 2020
- 2 state agency in process of evaluating
- 2 inactive state agencies starting process to move to BrR exclusively
- More counties and local agencies are starting to use BrR for load rating

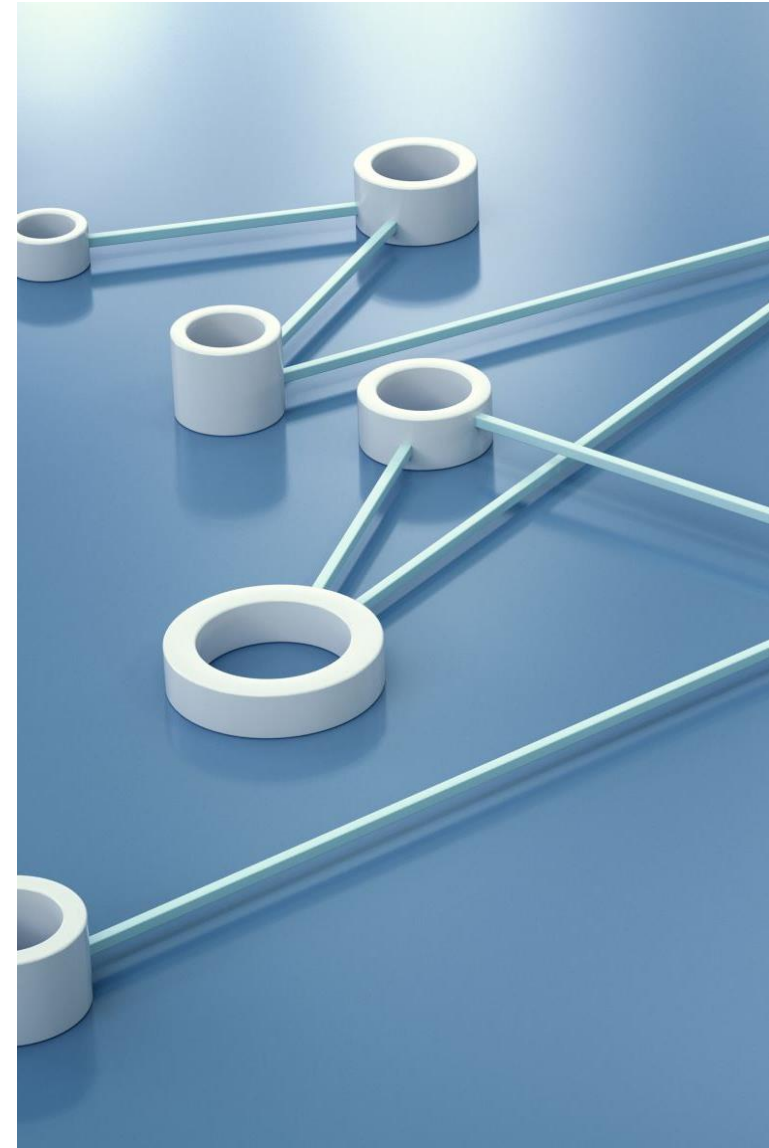
Limitations with current architecture

- Difficult for users to upgrade database under limited IT resources
- Analysis runtime tied to workstation
- Performance degrades under poor connectivity
- Difficult to share database
- Limited built-in QA/QC – agencies manage their own workflow



Why leverage the cloud?

- Most limitations can be addressed by a cloud solution
- Simplify upgrades and management
- Easier to scale; store large amounts of data; access to more compute power
- Distributed analysis (maintain on-prem analysis)
- Expose/share data directly with consultants
- Interactive QA/QC
- OS/OW permitting improvements
- More options for 3rd party developers
- And much much more!



(Initial) Requirements



AASHTOWare's goal to move toward SaaS



Must support multiple versions of client and engine



Must maintain on-prem database offering (for now)



Must maintain on-prem analysis capabilities



Must ease upgrades - one click (or two)



Must ease overall IT burden



Our vision...

- Develop the service infrastructure needed for cloud
- Create a portal to administer system and view bridge details
- Maintain desktop client
- Develop a web client
- Be multi-tenant from day 1
- Test driven development – test cases for everything (as much as possible)
- Implement a microkernel architecture for engine
- Implement a microservice architecture for cloud
- Support 3rd party support from day 1 (AASHTOWare OpenAPI)

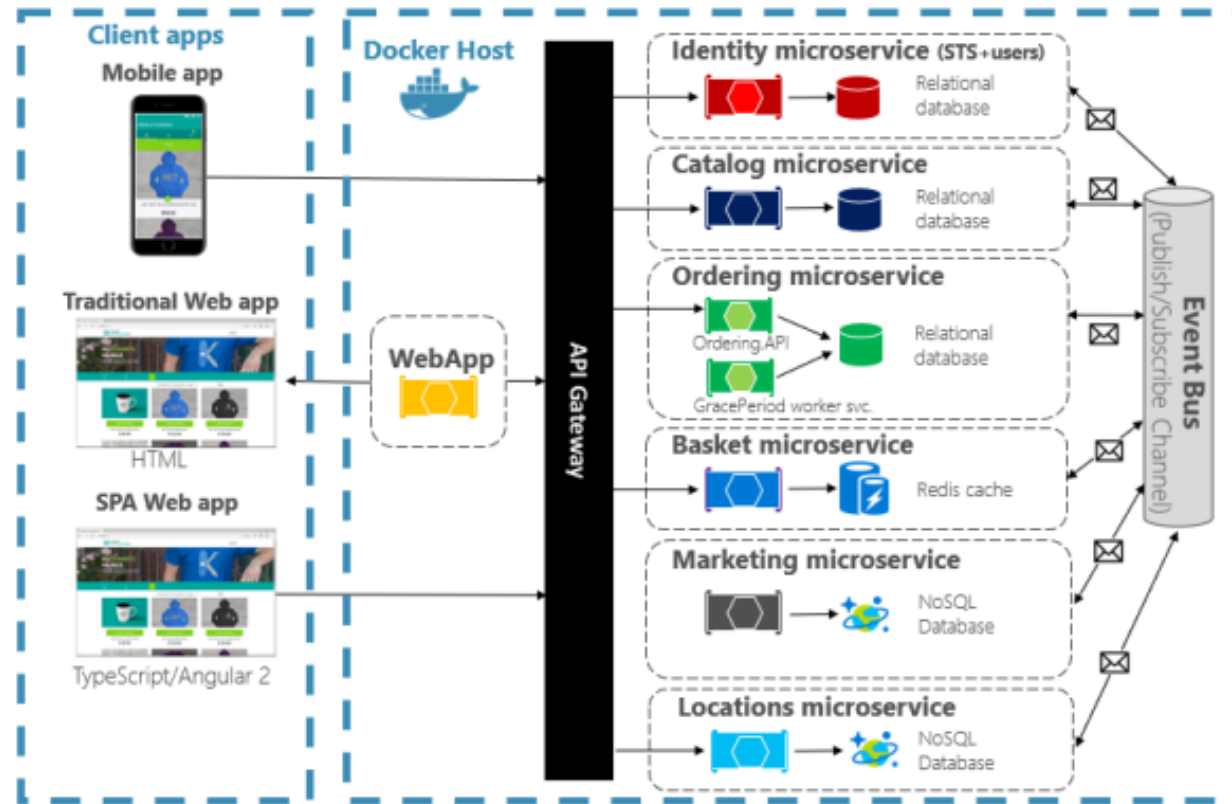


IDEA



PRODUCT

Our vision... Microservice Architecture



Our vision... User Interface

BrDR Cloud ProMiles / Settings / Overview

Search

Organization Settings ProMiles

Search Settings

General

- Overview
- Projects
- Users
- Extensions
- Security
- Permissions

Projects

Filter projects

Total 6 [+ New project](#)

<input type="checkbox"/>	Name ↑	Description	Last Updated
<input type="checkbox"/>	A AASHTOWareBr73		3/9/2020
<input type="checkbox"/>	A AASHTOWareBr73s		5/6/2020
<input type="checkbox"/>	T TestBridge72		4/4/2022
<input type="checkbox"/>	T TestNextVersion	Testing version 7.5	6/4/2020
<input type="checkbox"/>	P Pilot		4/4/2022

BrDR Cloud ProMiles / AASHTOWareBr73

Search

AASHTOWareBr73

- Bridges
- Analysis
- Model

Bridges

Mine All

Filter by BID

Bridge Name	BID	District	City	Facility
TrainingBridge1				
TimberTraining1				
RCTrainingBridge2				
MultiCell Box Examples				

Project settings

Our vision...

- Preliminary implementation
 - Phase 1 - “data in the cloud”
 - Infrastructure, data services, ADIF, and portal
 - Phase 2 – “analysis in the cloud”
 - Offload complex analysis, cloud analysis API
 - Phase 3 – “modeling in the cloud”
 - Model bridges entirely via web browser



IDEA



PRODUCT

What's next?



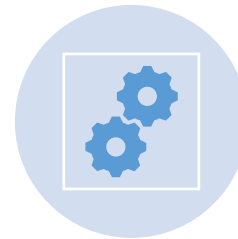
Held stakeholder meeting (July 2023)



Gathered stakeholder requirements and use cases



Compile remaining (initial) requirements and use cases



Refine preliminary architecture

A blue-tinted photograph of a long bridge over a body of water. In the foreground, there are large, dark rocks. A person is visible in a kayak on the water. The sky is overcast with some clouds. The word "Questions?" is written in white, bold, sans-serif font in the center of the image.

Questions?

A blue-tinted photograph of a long bridge over a body of water. In the foreground, there are large, dark rocks. A small boat is visible on the water in the middle ground. The sky is overcast with light clouds. The text "Thank you!" is overlaid in the center in a white, bold, sans-serif font.

Thank you!