
Cloud Progress and Hosted Database

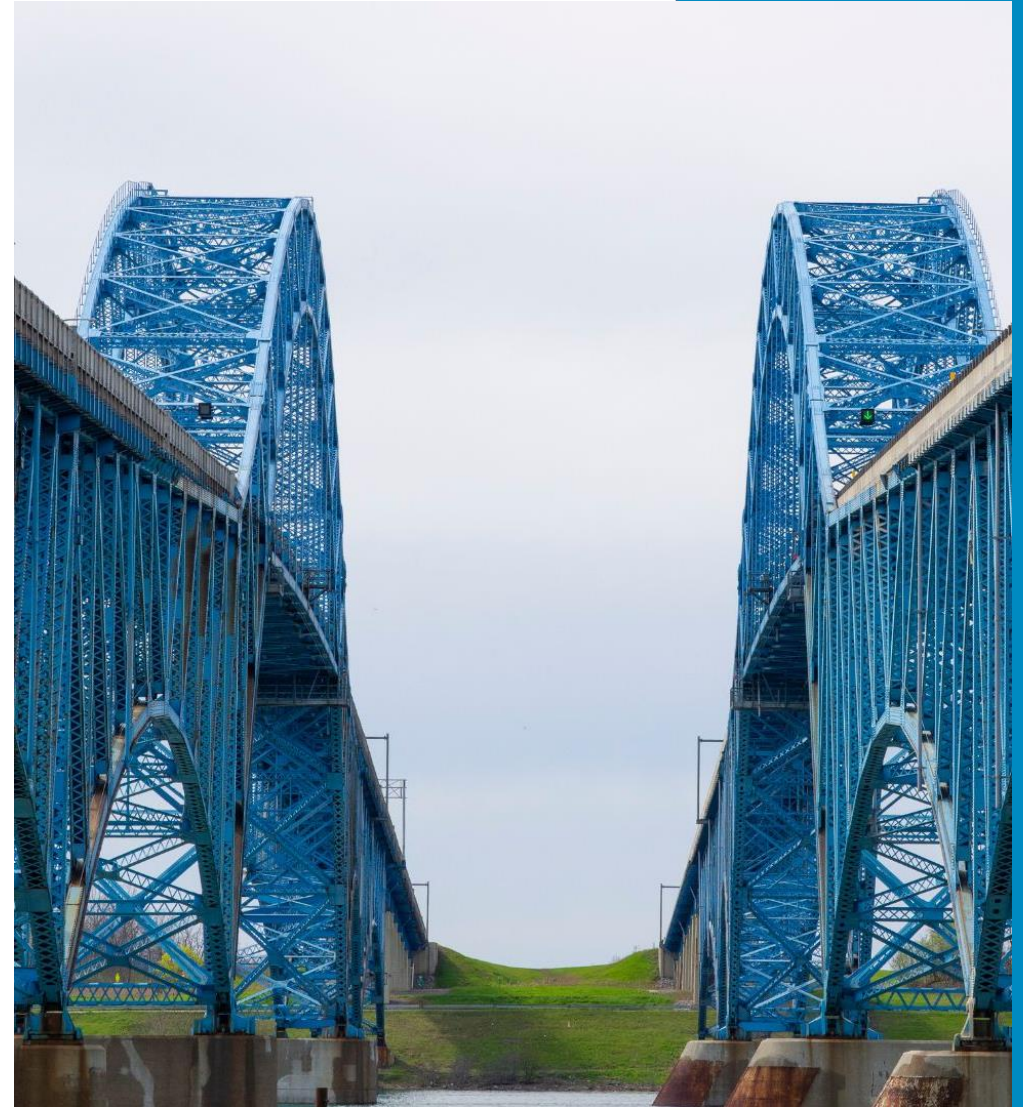
Geoffrey Trees

geoffrey@promiles.com

Kyle Plummer

kyle@promiles.com

RADBUG 2024 | August 6-7 | Buffalo, NY



Outline

- History
- Benefits of the Cloud
- Current Progress
- Next Steps
- Hosted Database (Current Offering)
- Questions

History

- Motivation for Cloud
 - Most or all modern software has some degree of cloud integration
 - Agencies and IT departments short on staff
 - Flexibility to offload “expensive” resources
 - Vendor management (support, issue resolution, migrations, upgrades)
 - Remote work, remote offices, consultant access, etc.,



History



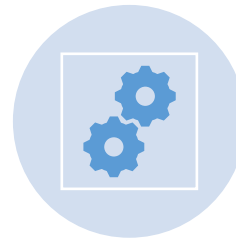
Identified Cloud Need
(Mid-Late 2010s)



AASHTOWare
Mandate To Cloud
(2020s)



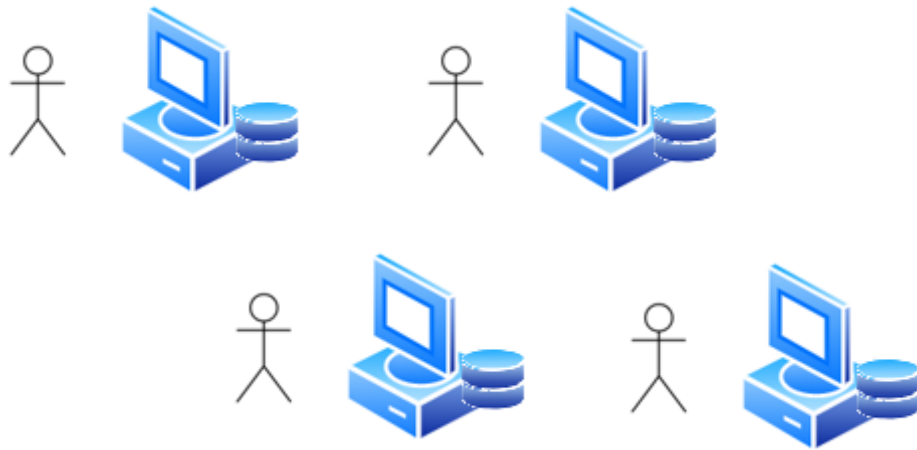
Began Speaking with
Users



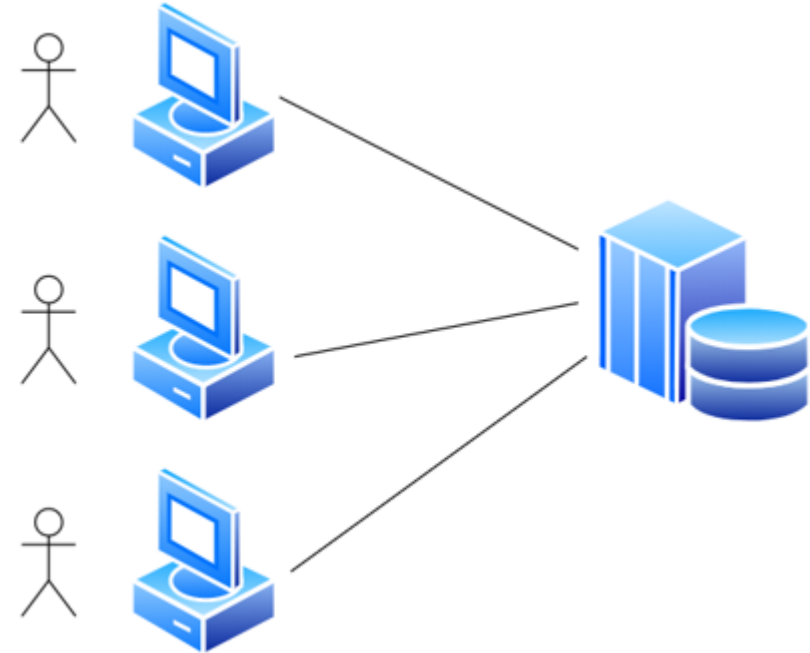
Drafted Initial Use
Cases

Benefits of the Cloud

- Original/Current Architecture

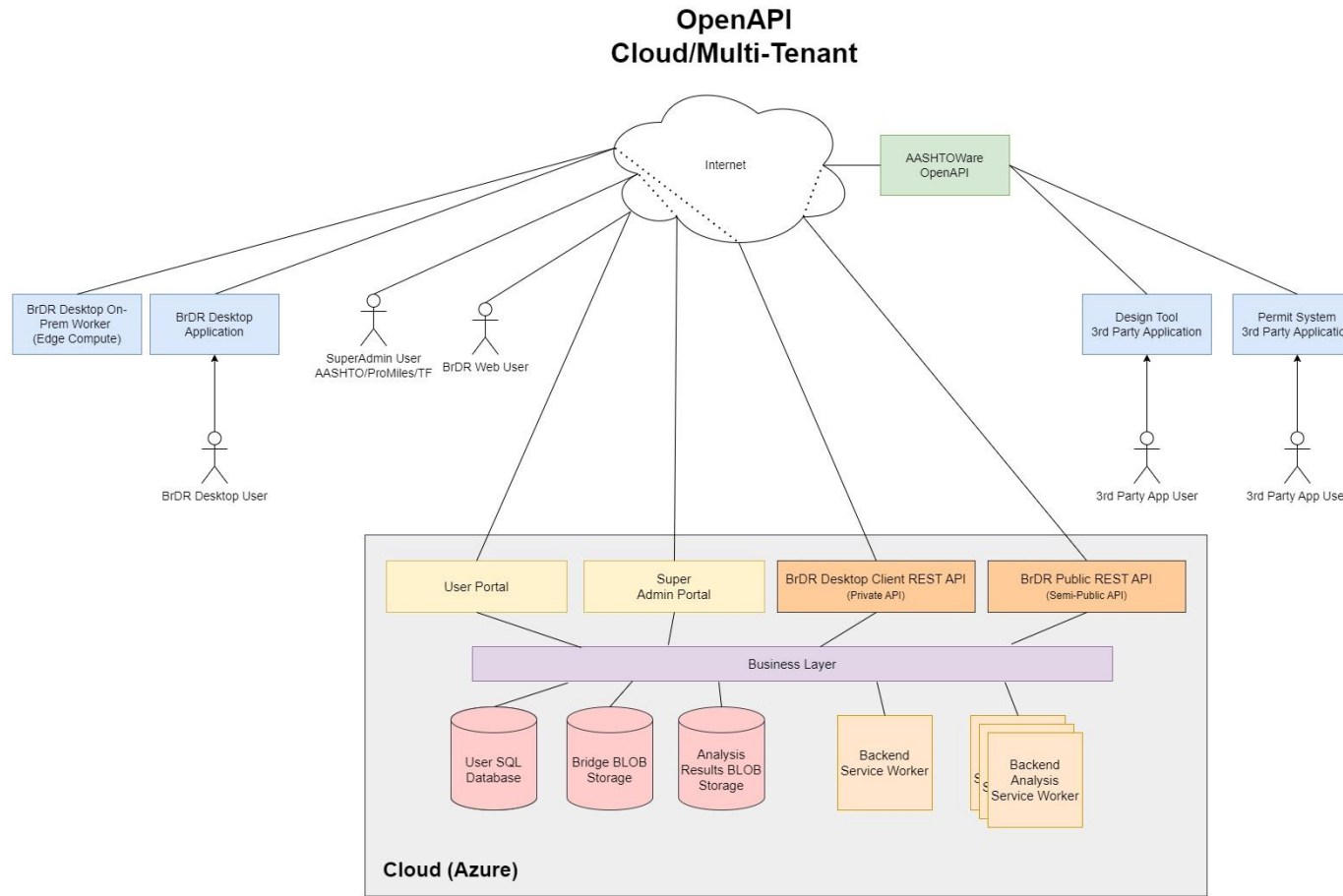


Local Database



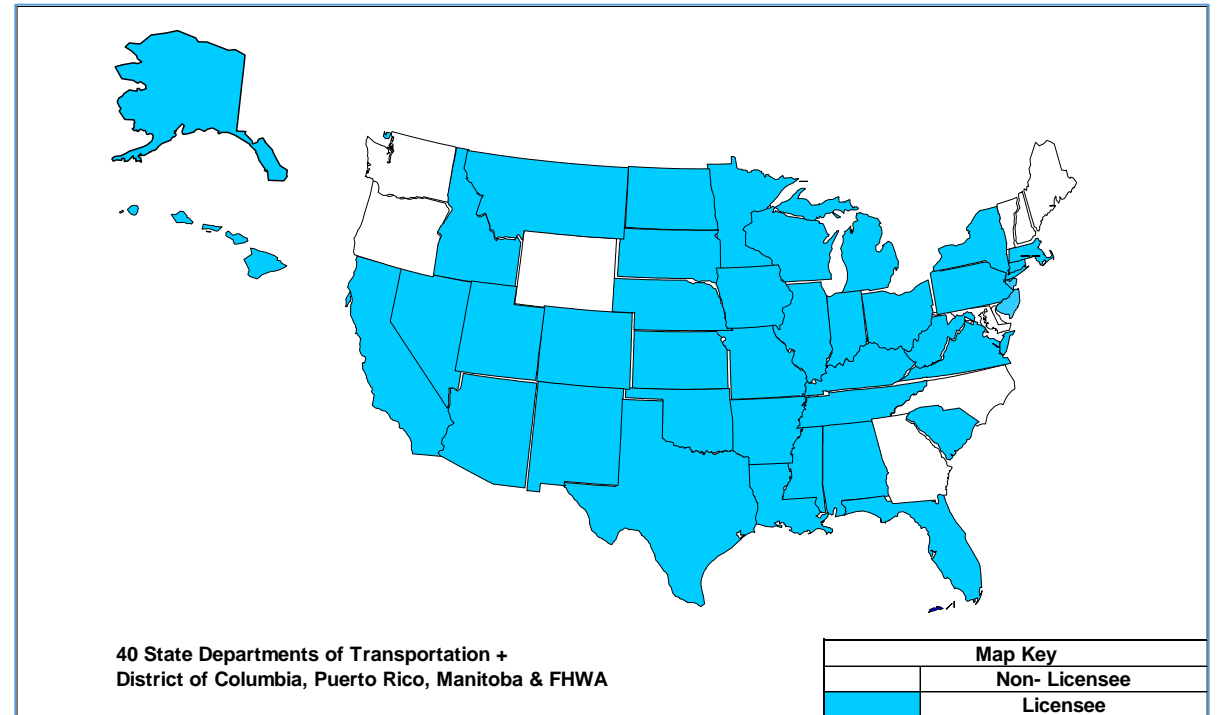
Centralized Database

Benefits of the Cloud



Benefits of the Cloud

- Currently Support:
 - Over 900+ individual licenses
 - 40 state agencies license
 - 3 state agencies evaluating
 - 100+ counties and local agencies



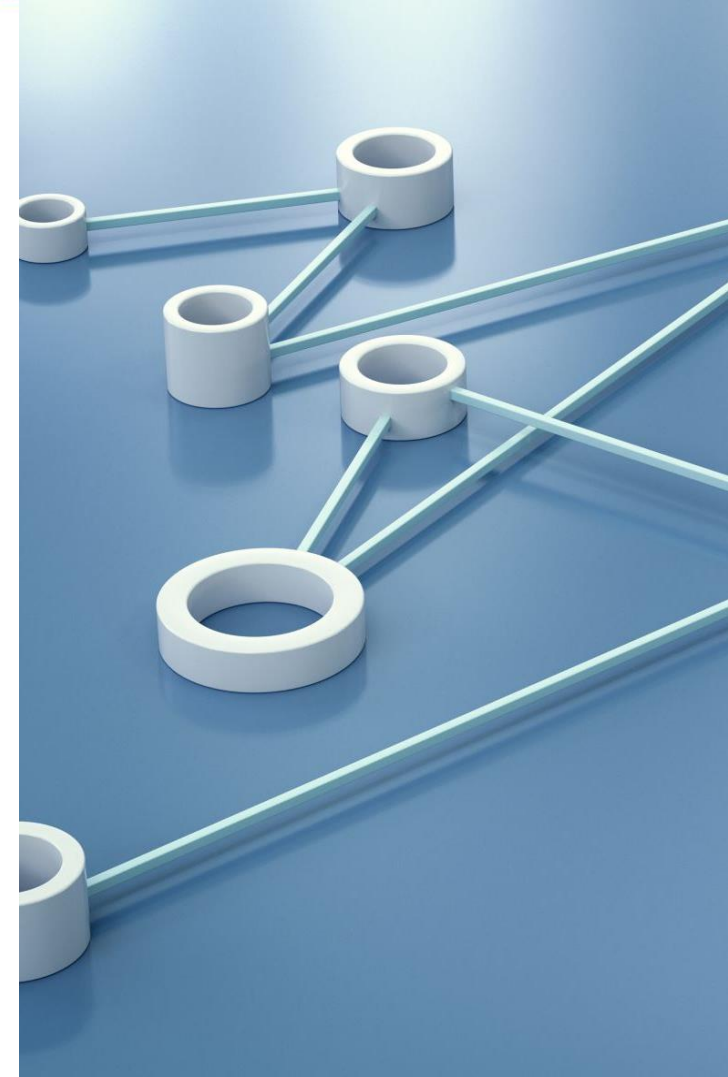
Benefits of the Cloud

- Current Limitations
 - 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



Benefits of 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!



Current Progress

- Held Architecture Workshop
- Gathered stakeholder requirements
- Outlined long-term high-level phases
- Began architecture design and experimentation
- Identified BrDR desktop client prerequisites
- Planning/scoping desktop client required enhancements



Current Progress

- Architecture Workshop (Summer 2023)
- Gathered requirements:
 - AASHTOWare's mandate to move toward SaaS/Cloud
 - Must maintain on-prem database support (for now)
 - Must support multiple versions of client and engines
 - Must maintain on-prem analysis capabilities
 - Must ease IT burden
 - Must ease upgrades



Current Progress

- 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

Current Progress

- Long-term high-level phases:
 - Phase 1 - “data in the cloud”
 - Infrastructure, data services, OpenAPI, portal, and desktop client
 - Phase 2 – “analysis in the cloud”
 - Offload complex analysis, cloud analysis API, cloud-hosted analysis, on-prem worker agent
 - Phase 3 – “modeling in the cloud”
 - Model bridges entirely via web browser



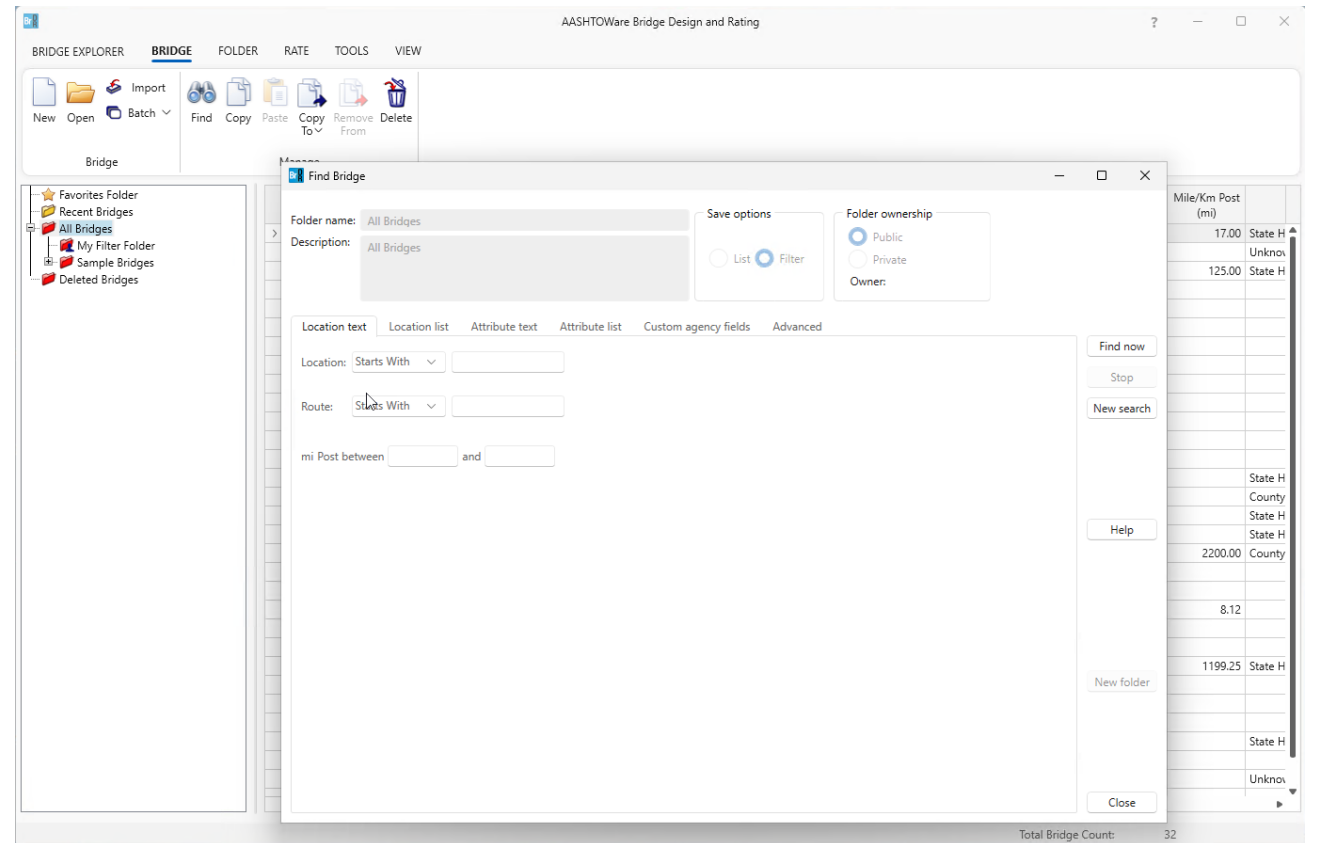
IDEA



PRODUCT

BrDR Desktop Client Prerequisites

- Identified BrDR Desktop Client Prerequisites:
 - Client Initialization Logic
 - Find Bridge Feature
 - Bridge Explorer Folders
 - Application Data Access
 - 3rd Party API Requirements



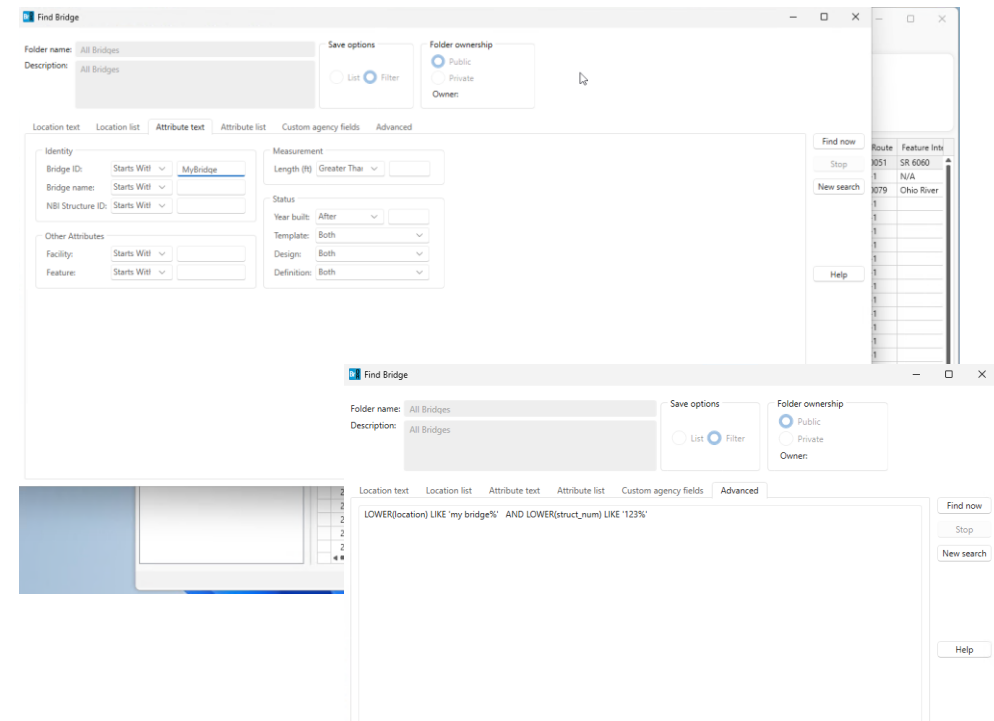
BrDR Desktop Client Prerequisites

- Client Initialization Logic
 - Logic during splash screen that downloads the Data Dictionary, System Data, Database Information, etc.
 - Static data downloaded each time application opens
 - More bandwidth = greater cost!



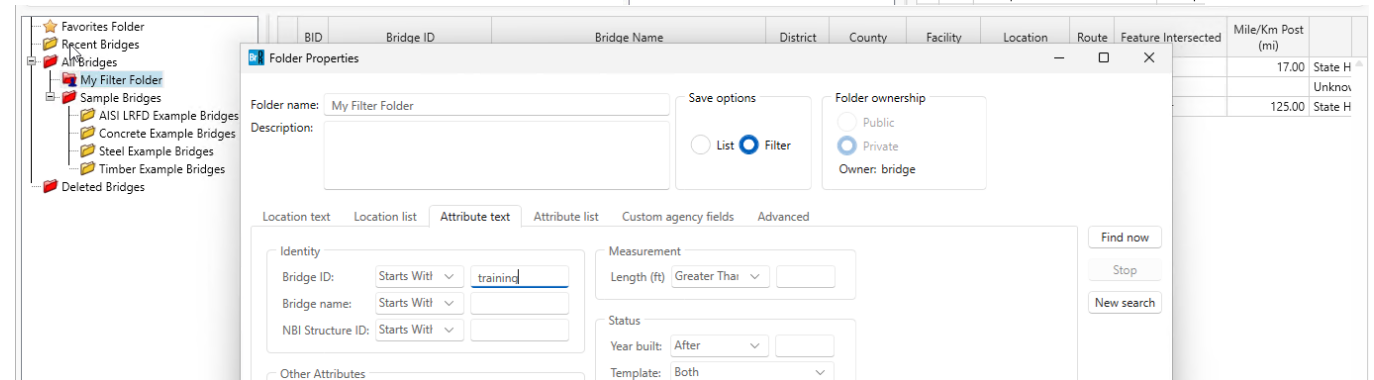
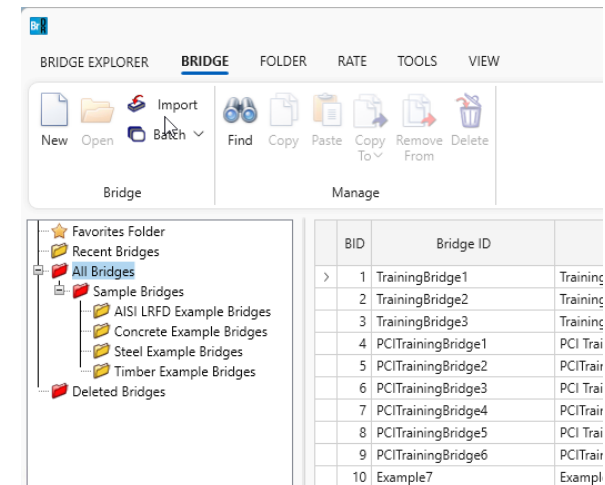
BrDR Desktop Client Prerequisites

- Find Bridge Feature
 - Feature to find bridges based on “bridge description” attributes (name, location, etc.)
 - SQL-based search will not work in the cloud
 - Currently limited search criteria



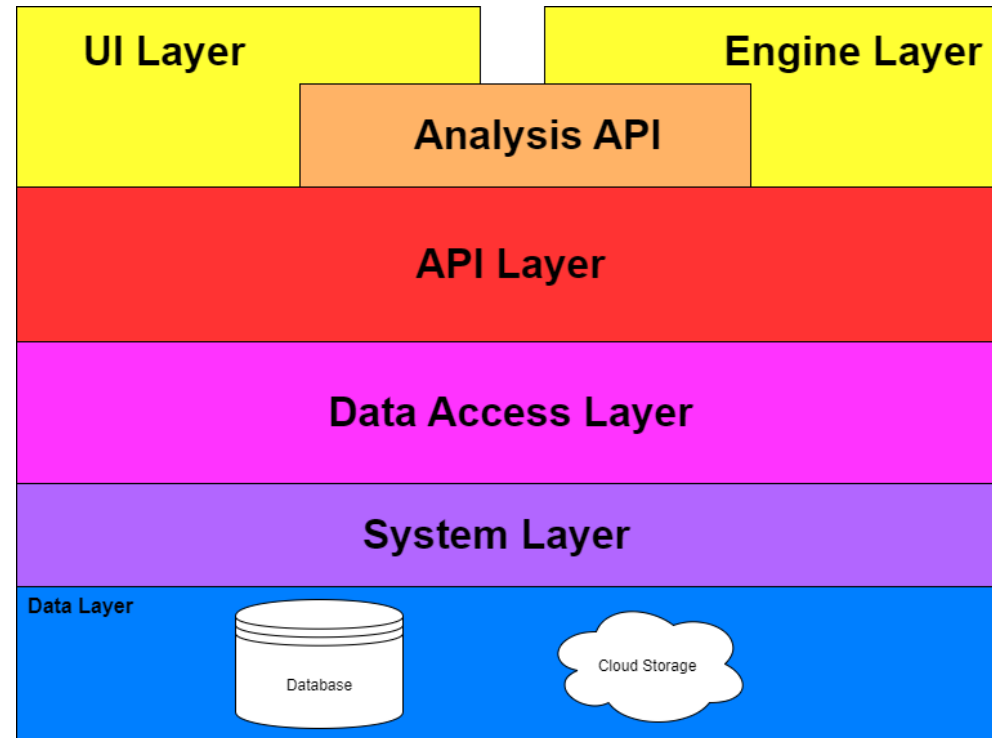
BrDR Desktop Client Prerequisites

- Bridge Explorer Folders
 - Filter and group bridges based on “bridge description” attributes
 - SQL-based filters will not work in the cloud
 - Currently limited search criteria



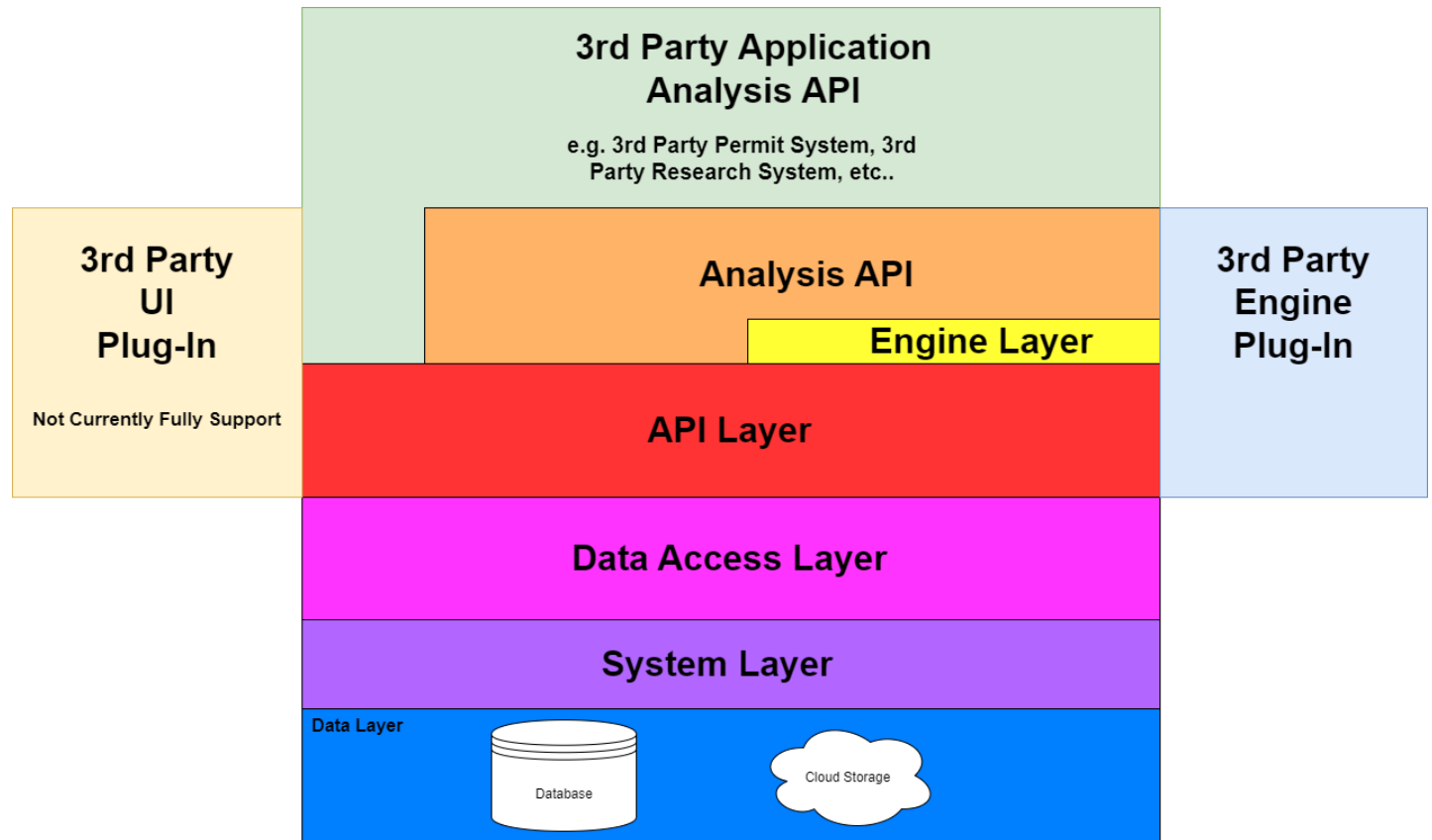
BrDR Desktop Client Prerequisites

- Application Data Access
 - “Foundation” layer
 - Transfer data to/from data storage (SQL/Cloud DB)



BrDR Desktop Client Prerequisites

- 3rd Party API Requirements
 - Changes needed for continued 3rd Party utilization



Next Steps



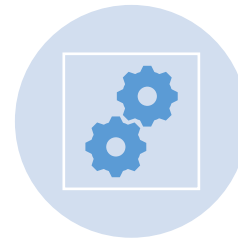
Refine preliminary architecture



Finalize experimentation and prototyping



Finalize Phase 1 architecture



Develop implementation workplan

Hosted Database (Current Offering)

- Database(s) created, maintained, and migrated by ProMiles
 - We deal with the hassles of the database, not you!
- Microsoft Azure SQL environment;
- 99.99 percent uptime guarantee;
- Two production site migrations included;
- Test database access (before and/or after upgrades);
- Periodic refreshing of test database data from production database;
- Unlimited number of users can access;
- Performance monitoring by ProMiles;
- Automatic nightly database backups retained in Azure Blob storage for 90 days; and
- Data encryption (both at rest and in transit).

Hosted Database (Current Offering)

- Single-tenant solution
 - SQL Database in the cloud
- Easily migrated to SaaS cloud storage when available

SQL Database



BrDR Cloud Service



RADBUG 2024 | August 6-7 | Buffalo, NY

Questions?