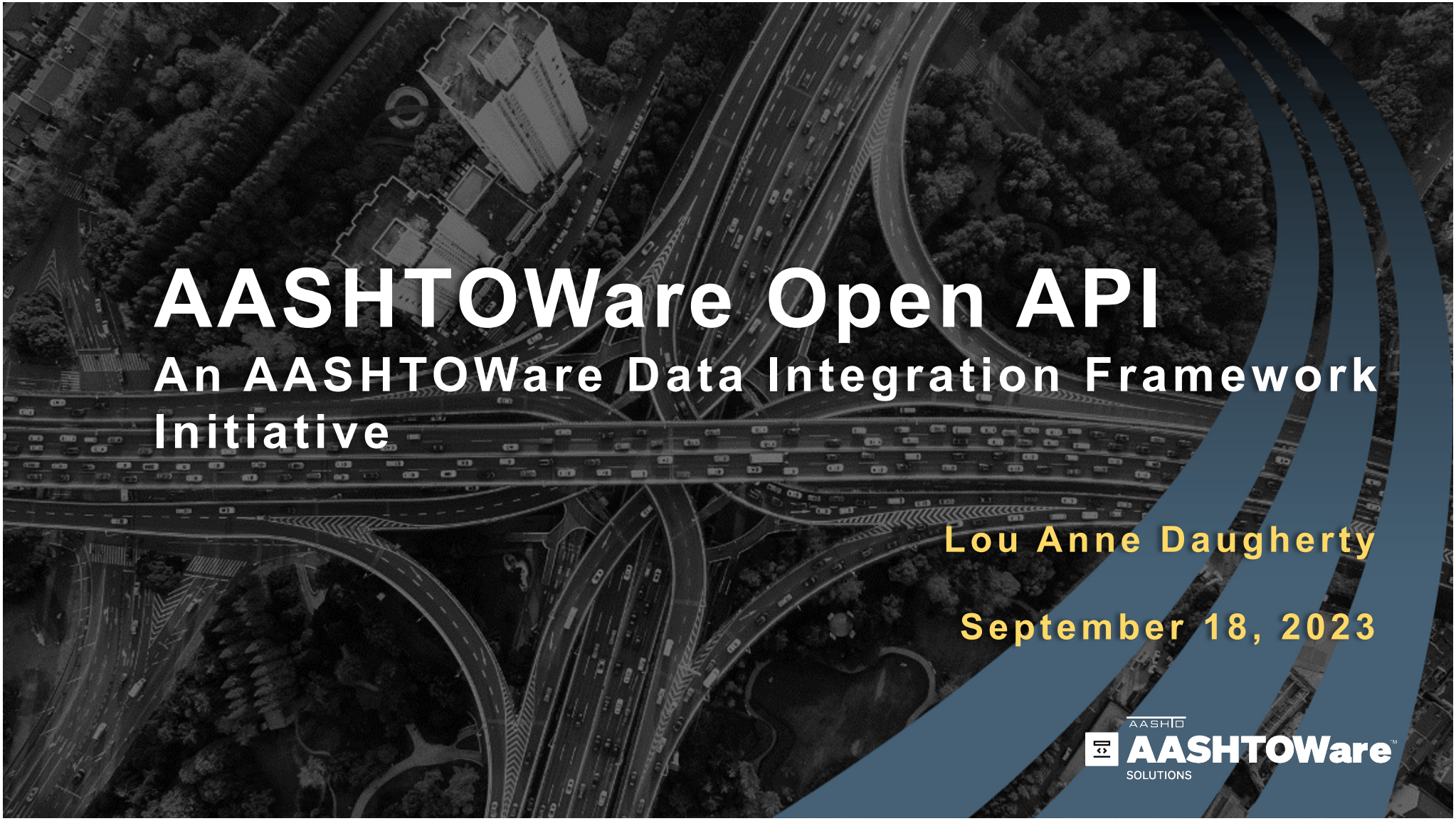

AASHTOWare Open API

An AASHTOWare Data Integration Framework Initiative

Lou Anne Daugherty

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AASHTO AASHTOWare SOLUTIONS

Today's Presenter

Nebraska Department of Transportation – Business Technology Support Division

Chief Data Officer

Member of T&AA

Subcommittee Chair of Outreach and Coordination, Committee on Data Management and Analytics

Presentation Outline

- Introduction
- What is AASHTOWare OpenAPI?
- How does it work?
- Key benefits
- Concluding remarks

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What is an API

An API is a way for different applications and systems to communicate with each other over the internet. An API (Application Programming Interface) defines the rules and formats for exchanging data and information requests.

- Allows apps to access data and services from different sources and platforms
- Enables apps to reuse existing code and functionality without reinventing the wheel
- Facilitates interoperability and integration among different systems and devices
- Enhances security and privacy by limiting the access and exposure of sensitive data

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Introduction

- Suite of software products to help DOTs meet specific mission objectives
- Software developed, maintained and enhanced by DOTs for DOTs
- AASHTOWare products licensed by all 50 state DOTs, Territories and FHWA

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AASHTOWare Areas of Improvement

- Siloed products: Limited data connections between product suites
- Limited data connections with other enterprise products (GIS, Design, Financial Systems, etc.)
- Data integrations were expensive customized efforts at each DOT

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AASHTOWare Community's Need

- "…to make it easier to implement AASHTOWare products within the ecosystems of the DOTs' enterprise application landscapes."

In response, AASHTO's SCOA commissioned a two-phase AASHTOWare Standard Data Integration project in 2018

Phase I: AASHTOWare Standard Data Integration Project

Objectives

- Id high-value intra-AASHTOWare and AASHTOWare-to-enterprise system integrations
- Id data flows and use cases aligned with each of the high-value integration
- Develop a data dictionary for all AASHTOWare products

Outputs and Outcomes

- Data summit (Jan 2019) : 30+ DOTs (business + IT) AASHTOWare contractors, task forces
- Deep-dive case studies (4 DOTs)
- Identified & prioritized high-value data exchanges/integrations
- Outlined approach for standardized integration

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Example of High-Value Data Exchanges

Sending purchase order creation, payment and change order requests from AW Project to DOT financial system to support contractor payments

Sending completed projects and as-built assets data from AW Project & BrDesign system to DOT asset management system to support asset operations

Receiving list of projects into AW Project from DOT project management system to support estimation and preconstruction processes

Accessing document management system from AW Project to retrieve and/or save documents (contracts, signed change orders, material acceptance reports, travel diaries/traffic control, design plans, etc.)

Sending data (e.g. construction projects, costs, etc.) from AW Project to DOT enterprise data warehouse (GIS reporting system) to fuse AW Project data with other data sources (e.g. assets, financials) and support reports

AASHTOWare™ PROJECT

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Phase 1: Insights, Recurring Themes, Outcomes

- Phase 1 reinforced the value of AASHTOWare data/data dictionary
- DOT's can extract greater benefit from their applications/systems
- Standardized, simple, modern toolsets needed
- Other external platforms offered tooling centered on the OpenAPI Specification as the standardizing method
- Any long-term initiatives hinge on standardization and conventions, i.e., the OpenAPI specification

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Phase 2: Development of AASHTOWare OpenAPI

Three year-effort

- 2020-21: Build out platform
- 2021-22: Early pilots & refinement
- 2022-23: Advanced pilots
- 2023-24: Go live

A cloud-based solution that incorporates an API management system that acts as the API request “switchboard” for routing data to or from AASHTOWare installations. The AASHTOWare Open API creates new opportunities for DOTs to leverage their data more efficiently in new ways yet to be imagined.

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What is *AASHTOWare OpenAPI*

- Runs on a modern cloud foundation
- Incorporates the full suite of AASHTOWare products
- A web-delivered, standards-based, data service framework
- Extends agencies' existing AASHTOWare investment
- Adds new integration capabilities to existing AASHTOWare features
- Modernizes AASHTOWare as an open platform
- Allows secure and private connection of data between all DOT enterprise applications

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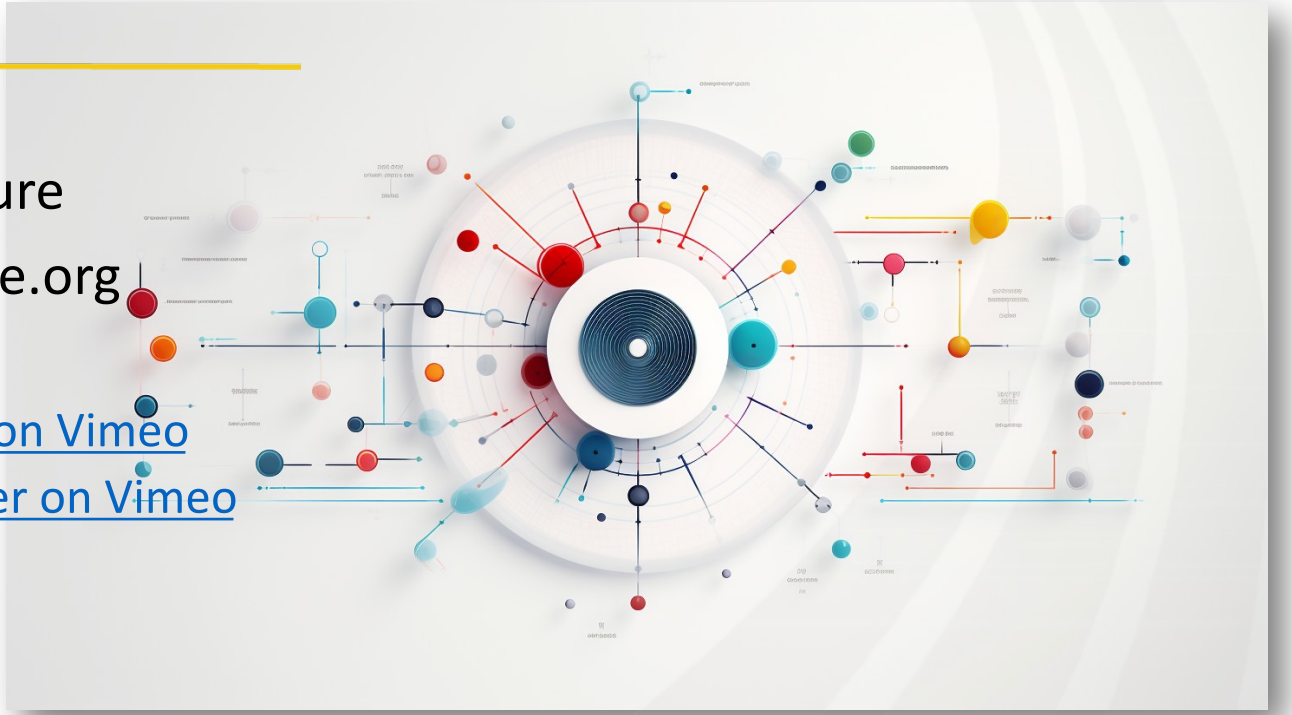
What Deployment Resources does AASHTOWare OpenAPI Include?



- Technology Infrastructure
- developer.AASHTOWare.org
- Concept Videos
  - AASHTOware Supplier on Vimeo
  - AASHTOWare Consumer on Vimeo
- api.AASHTOWare.org
- Help Desk
- Technical Training
- Integration guidance and reference materials

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Complex Systems
Simple Orchestration

- Connect systems in minutes
- Common data definition standards
- “Low Code” & “No Code” accessible
- No expert intervention
- Use existing office productivity tools
- APIs are the “plug-and-play” building blocks

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Benefits of AASHTOWare OpenAPI

- Establishes standards for accessing and managing AASHTOWare data and its connections over the web
- Eliminates traditional barriers by making AASHTOWare an open platform allowing for faster and more efficient Third-Party integrations.
- Allows for cheaper and quicker maintenance on data integration points
- Low-effort implementations of data integration
- Leveraging existing API-based integrations; build once, use often!
- Resources available to make use of the system with little to no training
- Immediate cross-platform, cross-stack, and language compatibility

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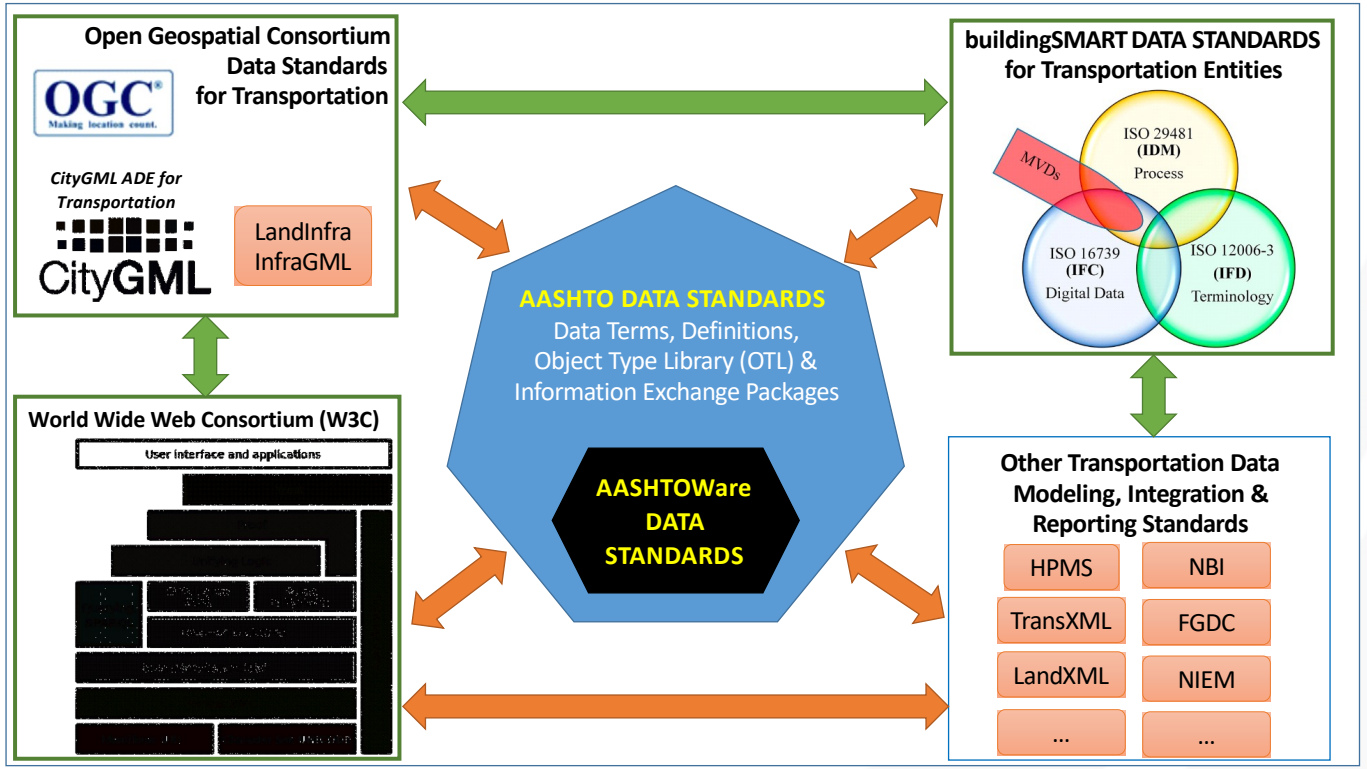
AASHTOWare OpenAPI and OpenBIM



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Closing - AASHTOWare OpenAPI

- Foundation to accelerate standards' adoption within AASHTOWare
- Channel to deliver AASHTOWare capabilities to accepted standards
- Eliminate the guess work through aligned guidance
- Innovation launch pad
- Finally realize productivity, efficiency, and functionality gains that have been envisioned for decades

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Questions?

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Thank you!

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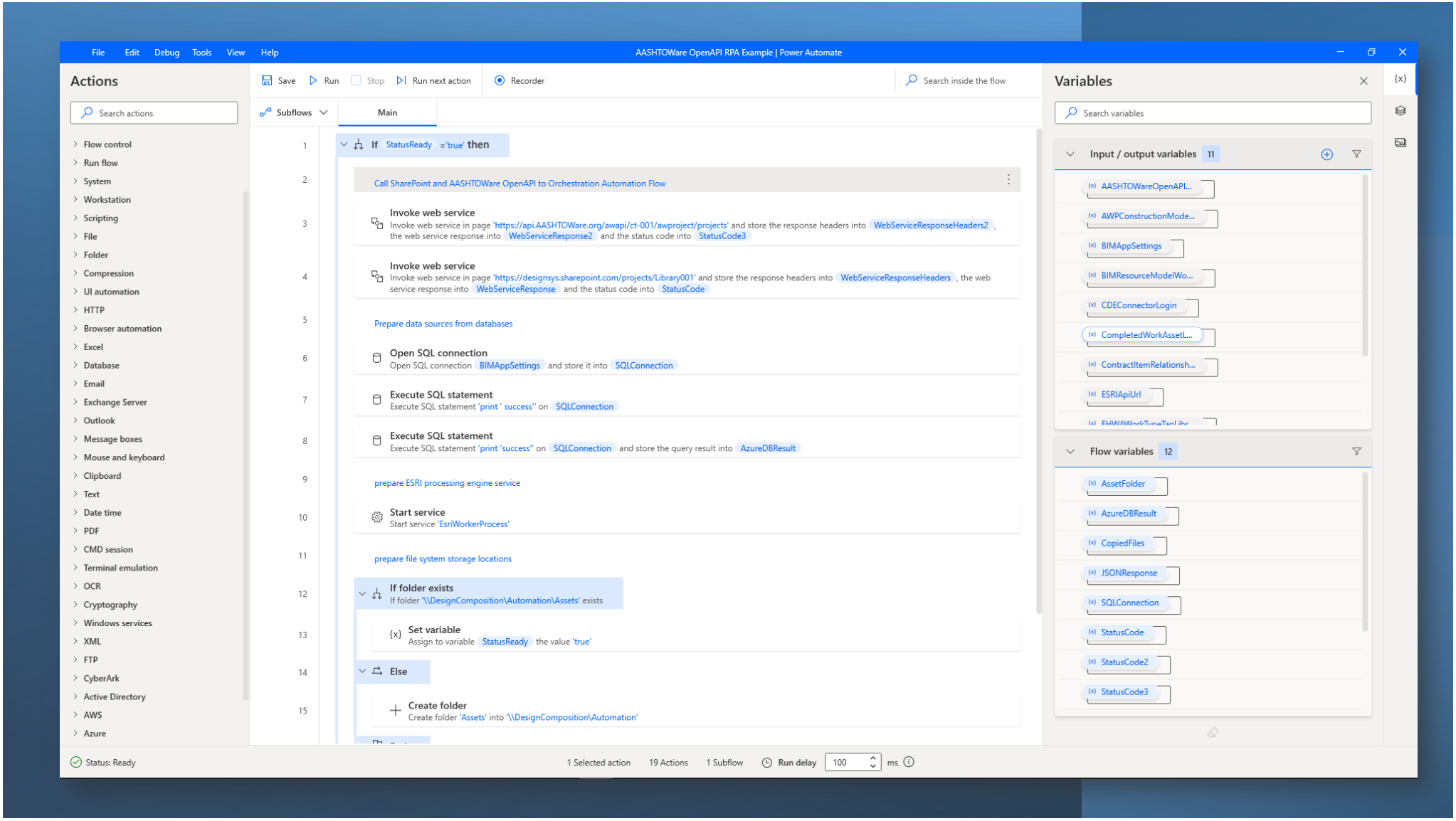
File Edit Debug Tools View Help
AASHTOWare OpenAPI RPA Example | Power Automate
Actions
Search actions
Flow control
Run flow
System
Workstation
Scripting
File
Folder
Compression
UI automation
HTTP
Browser automation
Excel
Database
Email
Exchange Server
Outlook
Message boxes
Mouse and keyboard
Clipboard
Text
Date time
PDF
CMD session
Terminal emulation
OCR
Cryptography
Windows services
XML
FTP
CyberArk
Active Directory
AWS
Azure
Save
Run
Stop
Run next action
Recorder
Search inside the flow
Subflows
Main
1 If StatusReady ='true' then
2 Call SharePoint and AASHTOWare OpenAPI to Orchestration Automation Flow
3 Invoke web service
Invoke web service in page 'https://api.AASHTOWare.org/awapi/ct-001/awproject/projects' and store the response headers into WebServiceResponseHeaders2, the web service response into WebServiceResponse2 and the status code into StatusCode3
4 Invoke web service
Invoke web service in page 'https://designsys.sharepoint.com/projects/Library001' and store the response headers into WebServiceResponseHeaders, the web service response into WebServiceResponse and the status code into StatusCode
5 Prepare data sources from databases
6 Open SQL connection
Open SQL connection BIMAppSettings and store it into SQLConnection
7 Execute SQL statement
Execute SQL statement 'print ' success'' on SQLConnection
8 Execute SQL statement
Execute SQL statement 'print 'success'' on SQLConnection and store the query result into AzureDBResult
9 prepare ESRI processing engine service
10 Start service
Start service 'EsriWorkerProcess'
11 prepare file system storage locations
12 If folder exists
If folder '\\DesignComposition\Automation\Assets' exists
13 Set variable
Assign to variable StatusReady the value 'true'
14 Else
15 Create folder
Create folder 'Assets' into '\\DesignComposition\Automation'
Variables
Search variables
Input / output variables 11
AASHTOWareOpenAPI...
AWPConstructionMode...
BIMAppSettings
BIMResourceModelWo...
CDEConnectorLogin
CompletedWorkAssetL...
ContractItemRelationsh...
ESRIApiUrl
Flow variables 12
AssetFolder
AzureDBResult
CopiedFiles
JSONResponse
SQLConnection
StatusCode
StatusCode2
StatusCode3
Status: Ready
1 Selected action
19 Actions
1 Subflow
Run delay
100
ms

Agency-Proposed Enterprise Scenarios

- Common extension integrations aligned to InfraGML, IFC, GeoJSON
- Apply IFC scaffolding to AASHTOWare data in support of modelling/design
- Leverage work history information as advanced data enrichment for asset management frameworks
- Apply BIM practices to infrastructure-focused concepts
  - AASHTOWare data
  - “Translate” to and between evolving and established formats
- Greater streamlining in design, geospatial, and assets workflows

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Today's Presenter

Joe Bruewer

Chair, AASHTOWare Data Integration Oversight Team

AASHTOWare T&AA Member

Michigan DTMB IT Manager Supporting MDOT

Supporting AASHTOWare for over 20 years

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