

DevSecOps for MaaS

Brendan Hernandez
J. Simmons, Ph.D.
NG MDAO Solutions

GLOBAL PRODUCT DATA
INTEROPERABILITY
S U M M I T
2021



Brendan Hernandez

Principal FTL Systems Engineer, NGSP Launch Vehicles

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4+ years at Northrop Grumman

- 2017-2020: Marine Systems: Sunnyvale, CA
- 2020-2021: FTL F35 Systems Engineer – San Diego, CA
- 2021-present: MDAO Solutions Team Lead – Chandler, AZ

I enjoy...

- Camping with Roof Top Tent
- Boating and Wakeboarding
- Exploring the Phoenix area



J. Simmons, Ph.D.

Systems Engineering Manager, NGSP Launch Vehicles

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15 years in Digital/Systems Engineering

- Ph.D. in Space Systems Engineering from the Air Force Institute of Technology
- M&S automation/integration for MDAO
- Implementing Digital Threads between MDAO & MBSE

Supported all corners of the Aerospace Industry

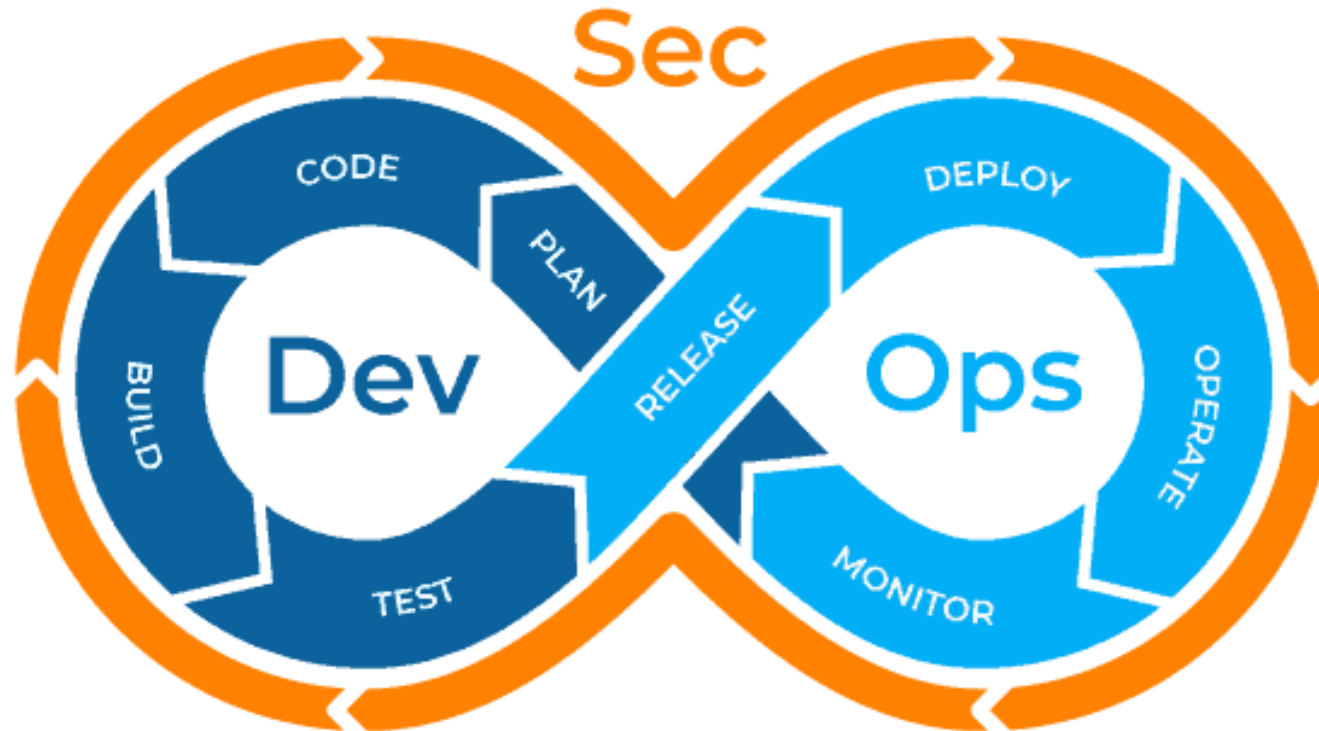
- Govt: DoD | Air Force | Navy | Army | NASA
- Cont: NGC | Lockheed | Boeing | Raytheon | SAIC
- Labs: JPL | APL | SNL



What is DevSecOps?

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DevSecOps is an approach to implementing product lifecycle for software...



and we can use this approach with our analytic models because models **are** software.

ModelCenter Integrate

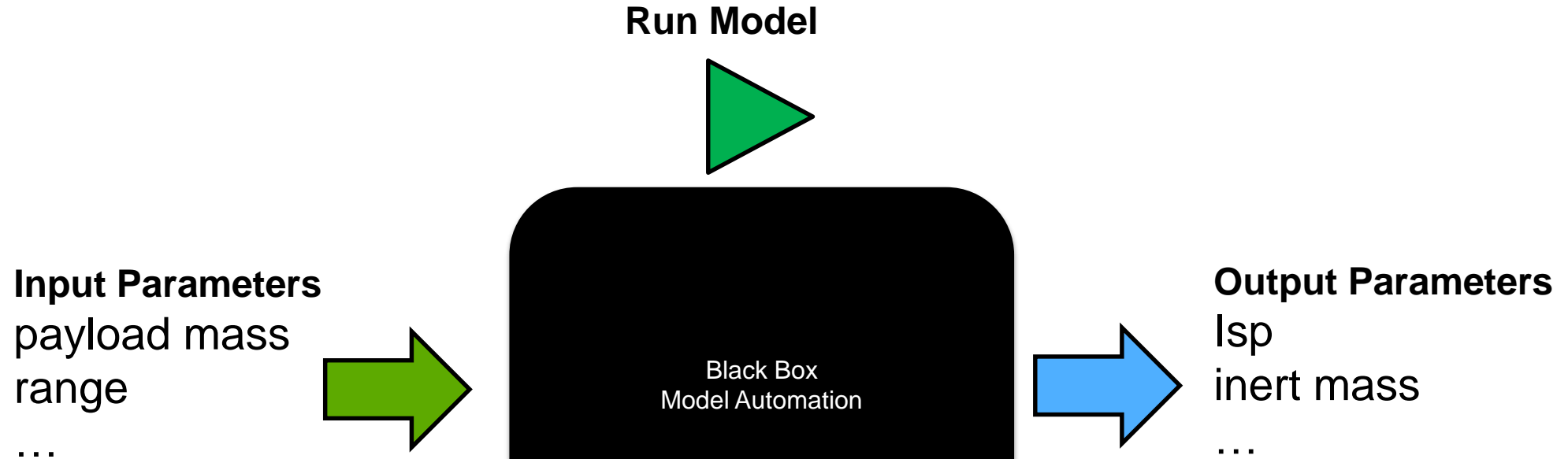
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Automate
Integrate
Execute



Model-as-a-Service (MaaS) Review

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- Provides access to run the models without having to give the models to consumers (internal & external)
 - Disciplines own their models
 - Disciplines regulate model execution through parameter bounds
- Model owners control access
 - Access can be controlled by groups/users
 - Model visibility can be controlled by groups/users
 - Access can be turned on/off at any time
- Model Access > Model Distribution
 - Model Owners (NGC) retains intellectual property
 - Customers can run models without the overhead of maintaining modeling environments

- Any analytic model can go in the Black Box
- Models run on remote server
- Access models over network

MaaS Enables Collaboration Across Sites

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What does DevSecOps for MaaS Look Like?

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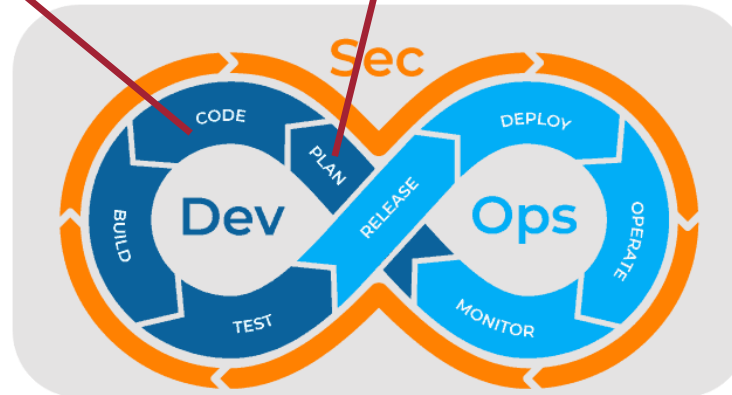
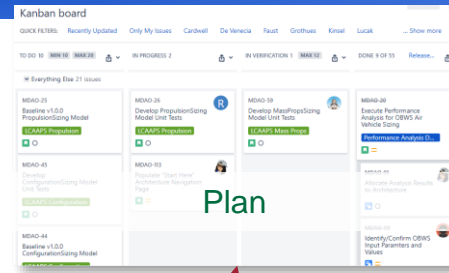
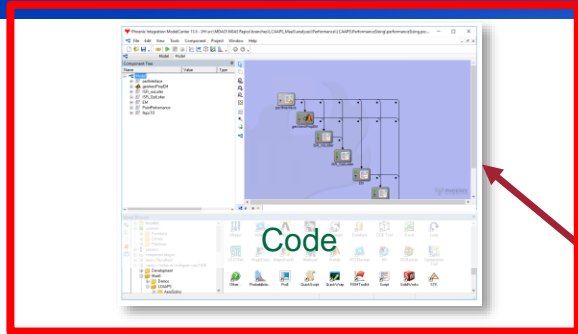
Plan

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- **Establish engineering needs and goals**
 - **Involve stakeholders to understand all concerns**
 - **Write acceptance criteria**
 - **Define requirements for new capability**
- **Define and Plan work to achieve engineering needs and goals**
 - **Complete in an Agile fashion**
 - **Jira is most common tool chosen**
- **Prepare workspace(s) for program needs**
 - **Add repositories to store models and code**
 - **Choose tools and versions to meet needs**
 - **Ensure engineers are using consistent workspace configurations**

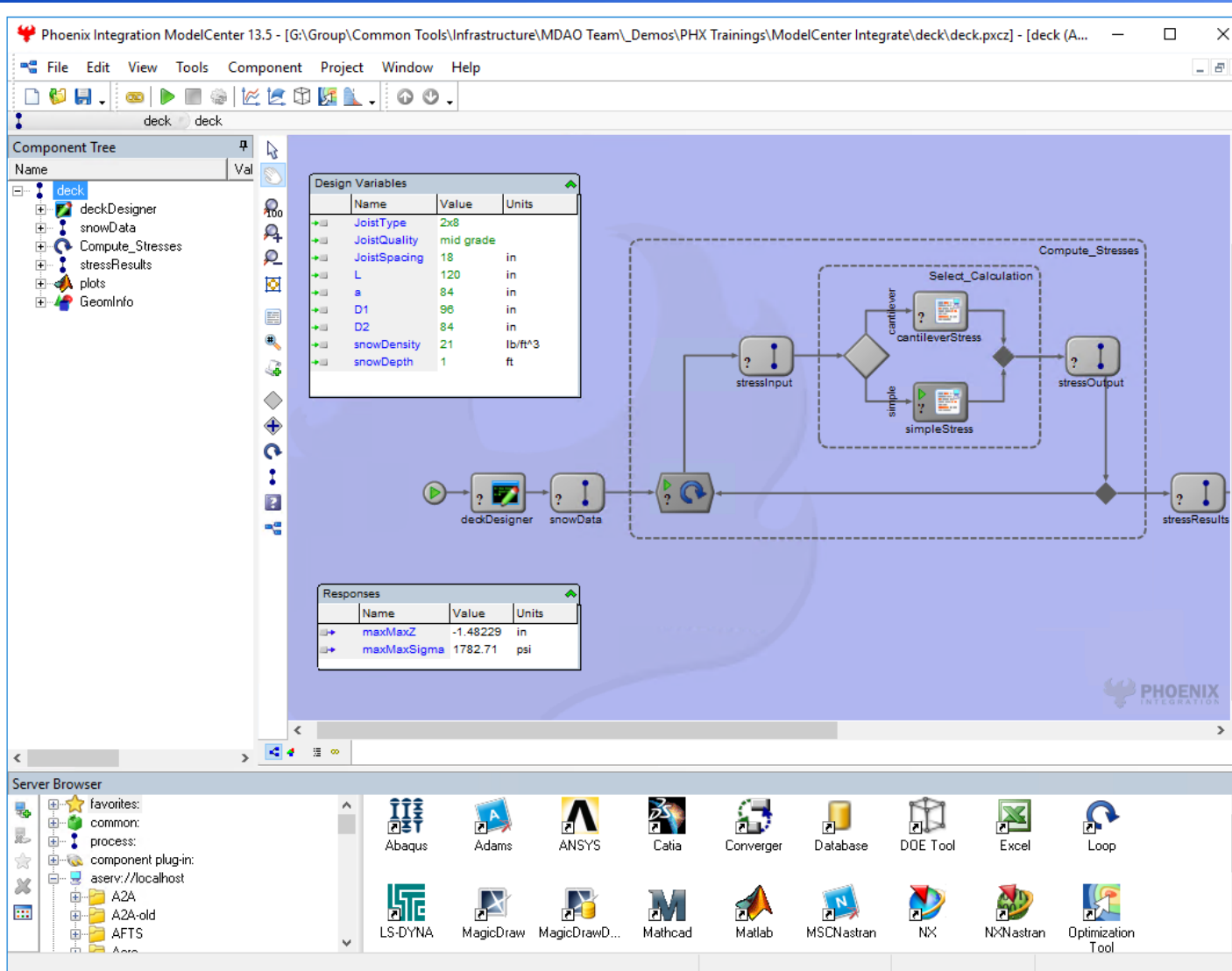
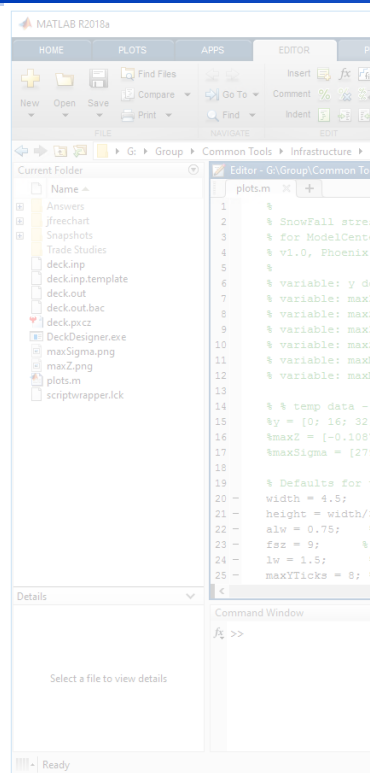
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Code

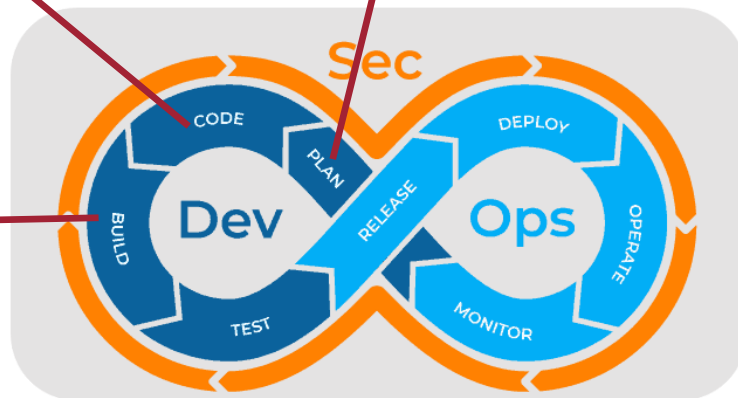
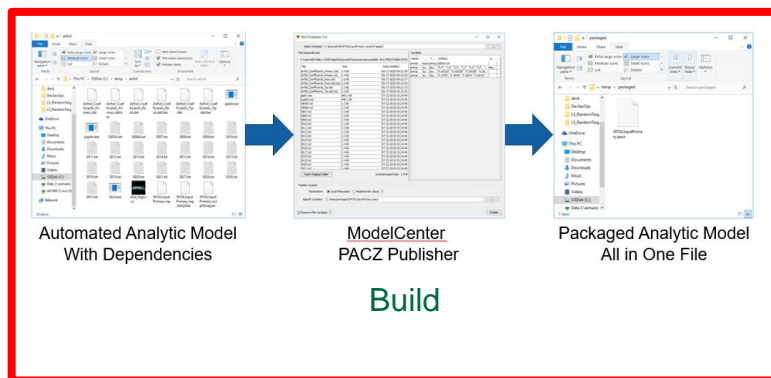
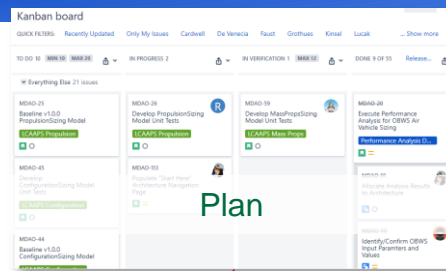
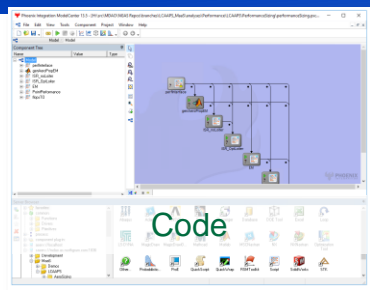
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```
run finished after 3188 ms
38 containers found
0 containers skipped
38 containers started
1 containers aborted
37 containers successful
0 containers failed
138 tests found
0 tests skipped
138 tests started
0 tests aborted
138 tests successful
0 tests failed
```

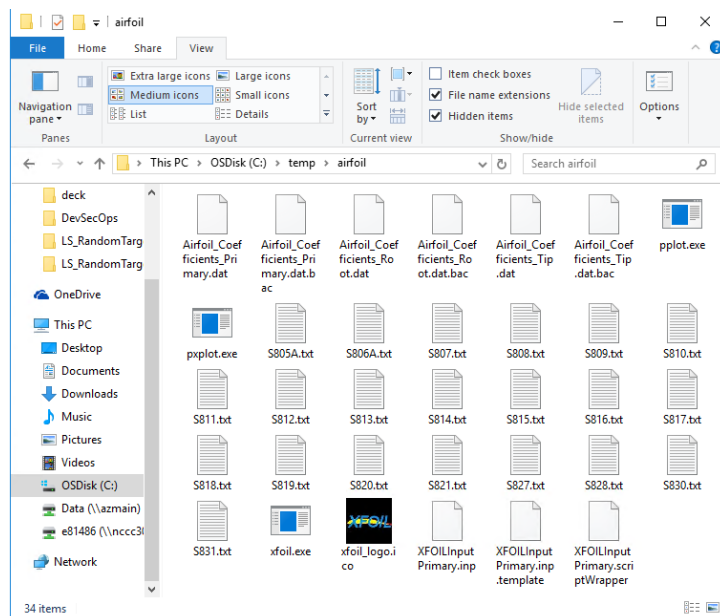
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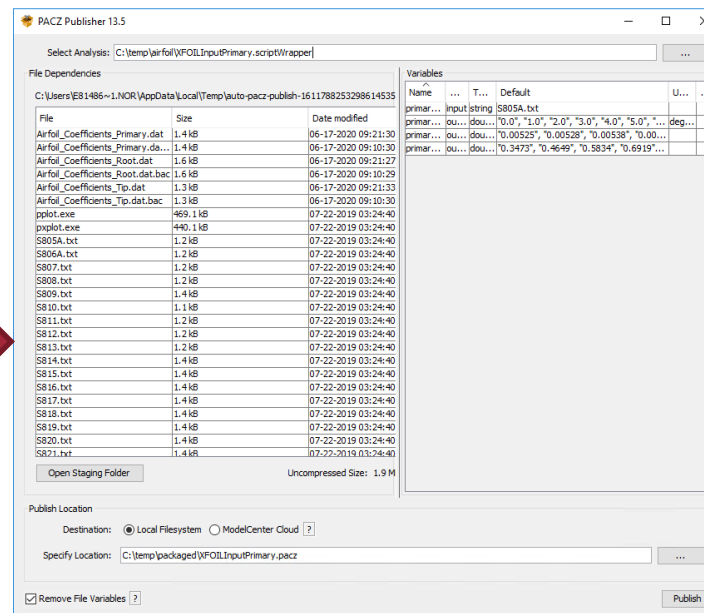


Build

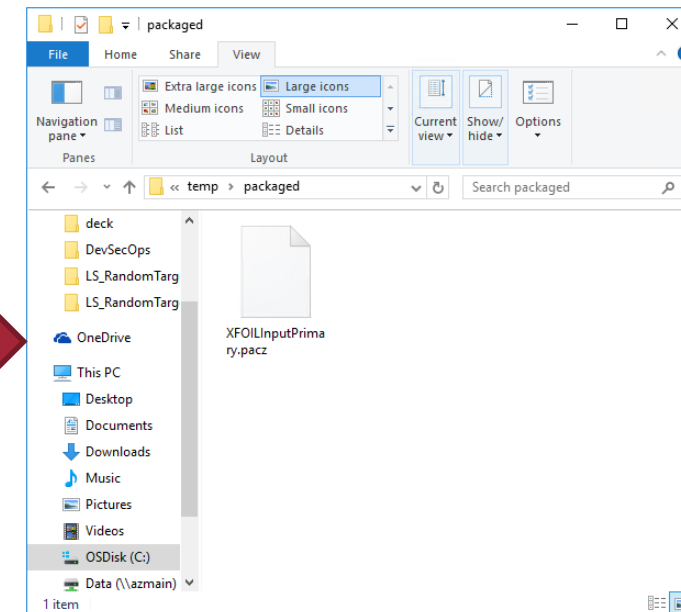
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Automated Analytic Model
With Dependencies



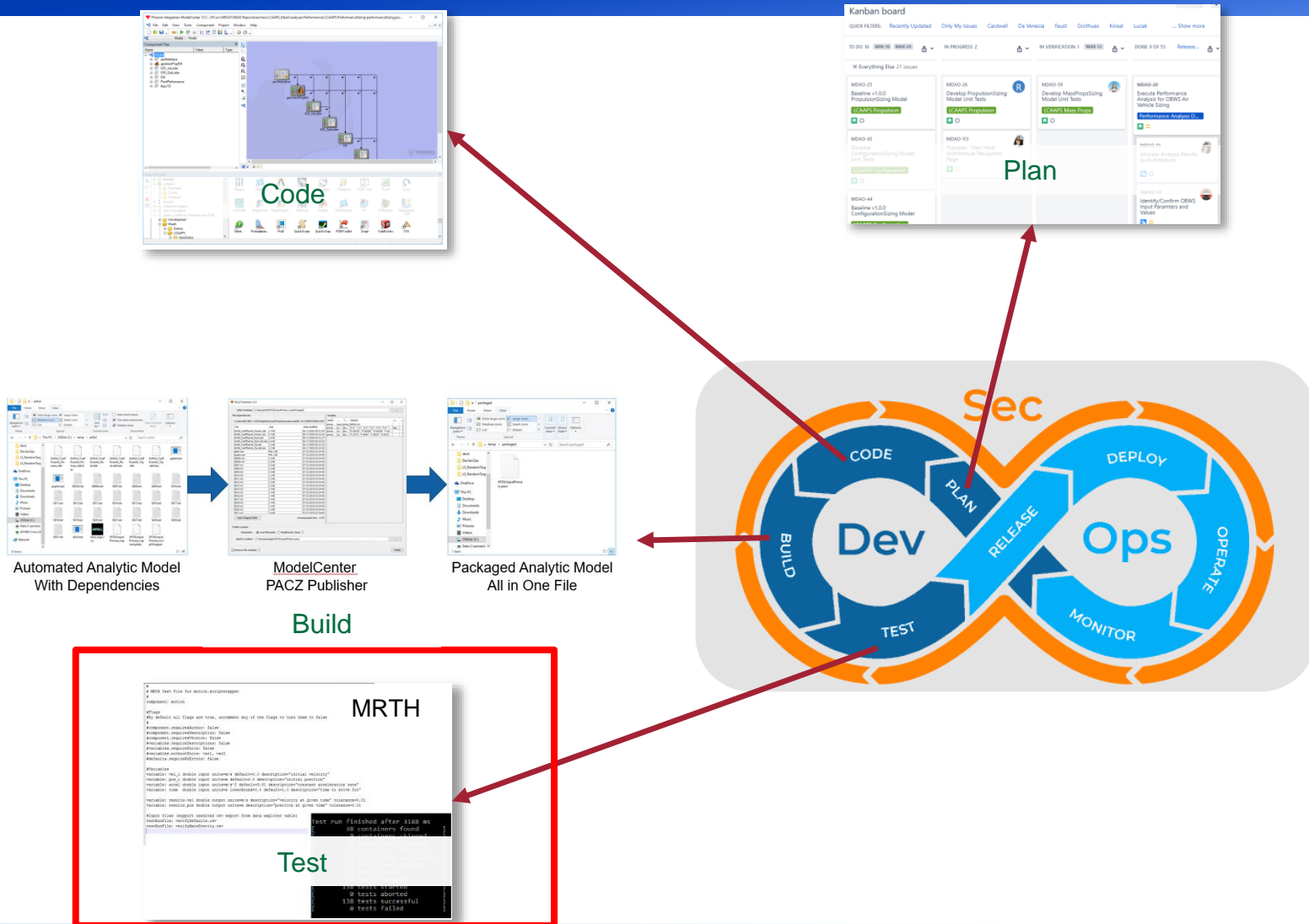
ModelCenter
PACZ Publisher



Packaged Analytic Model
All in One File

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Test

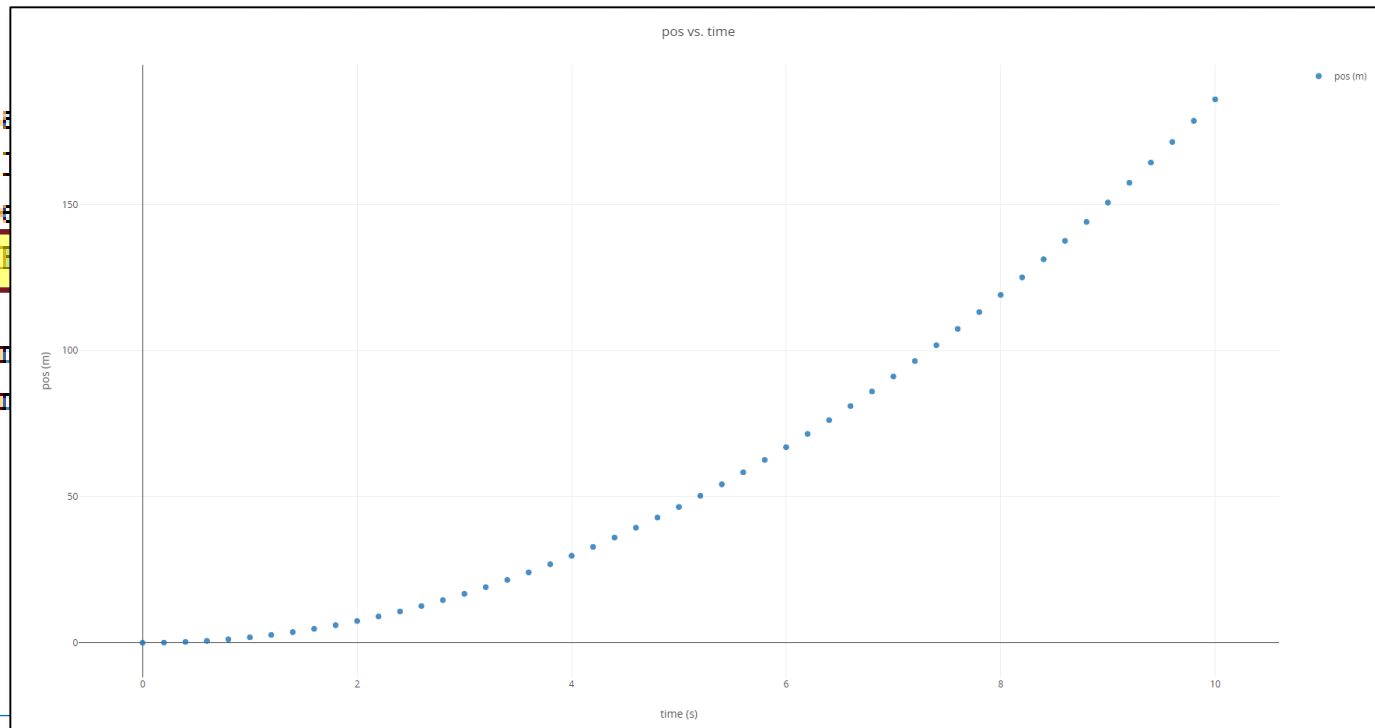
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```
#component.requiresAuthor: false
#component.requiresDescription: false
#component.requiresVersion: false
#variables.requireDescriptions: false
#variables.requireUnits: false
#variables.withoutUnits: var1, var2
#defaults.requireNoErrors: false
```

#Variables

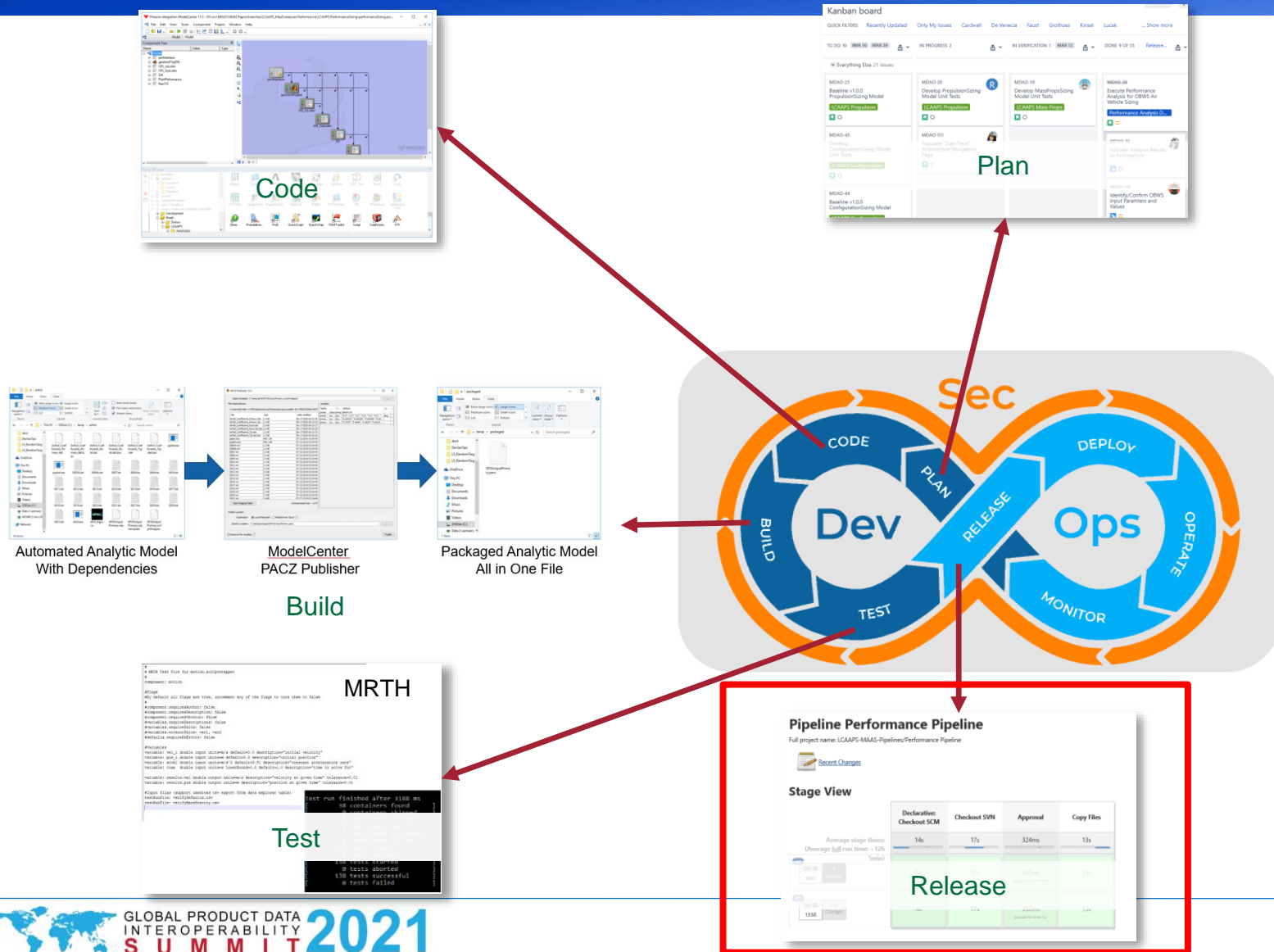
```
variable: vel_i double input units=m/s default=0
variable: pos_i double input units=m default=0
variable: accel double input units=m/s^2 default=0
variable: time double input units=s lowerBound=0
```

```
variable: results.vel double output units=m/s
variable: results.pos double output units=m
```



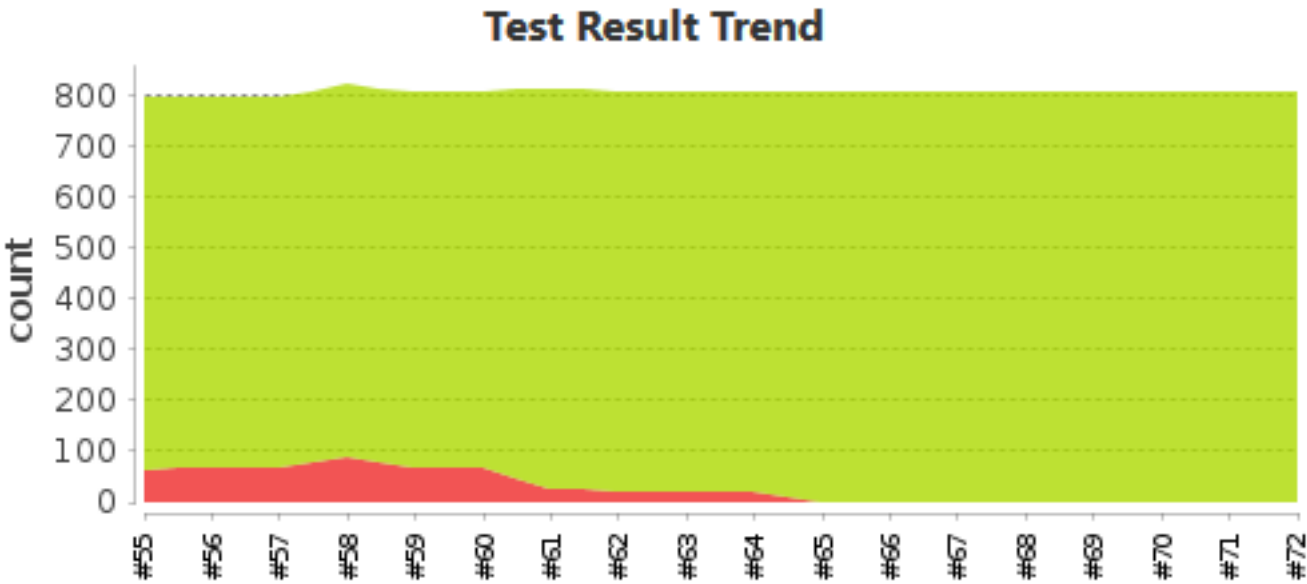
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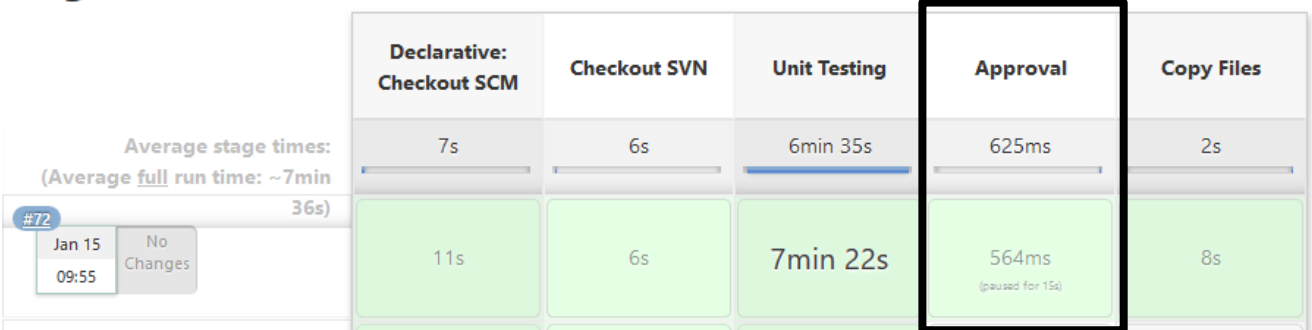


Release

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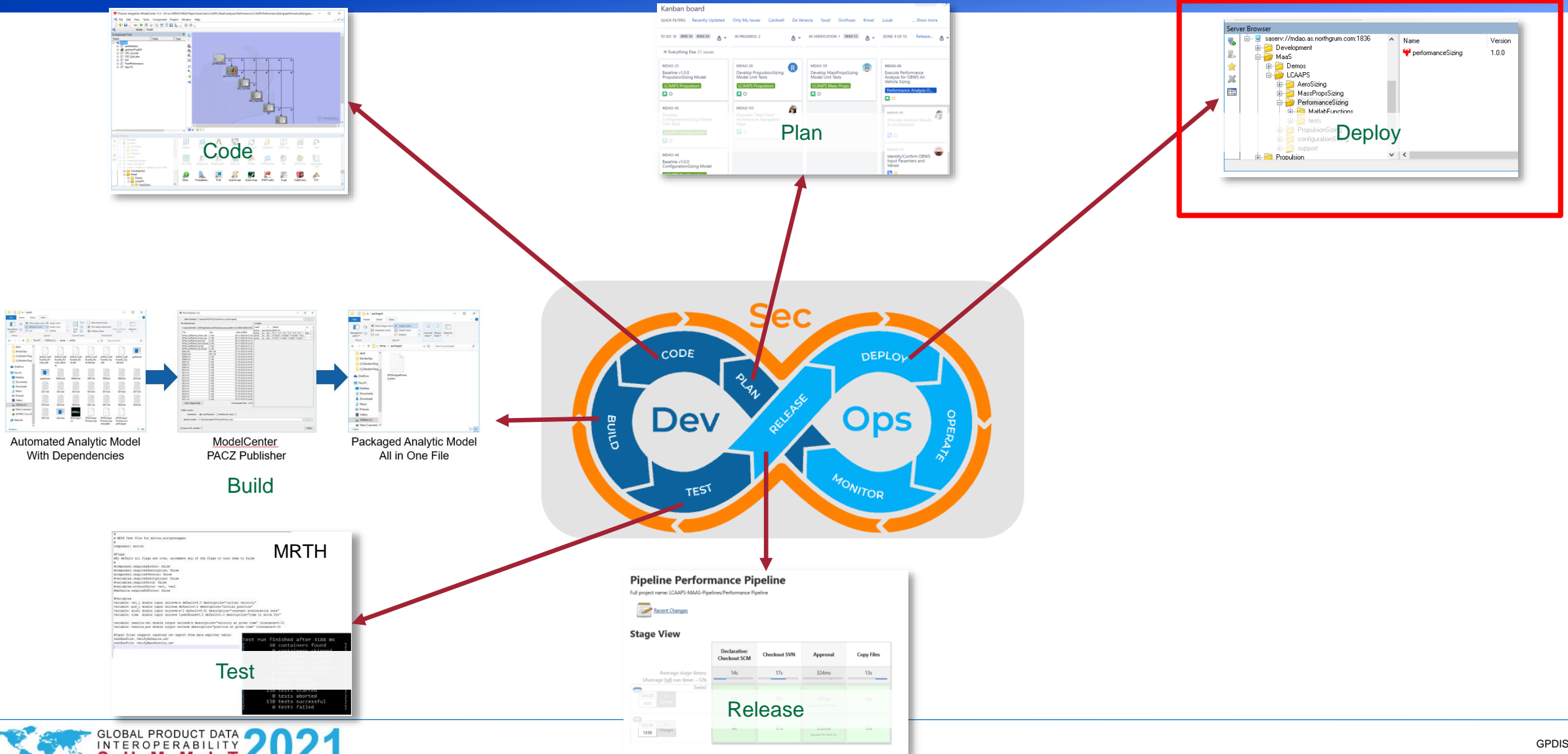


Stage View



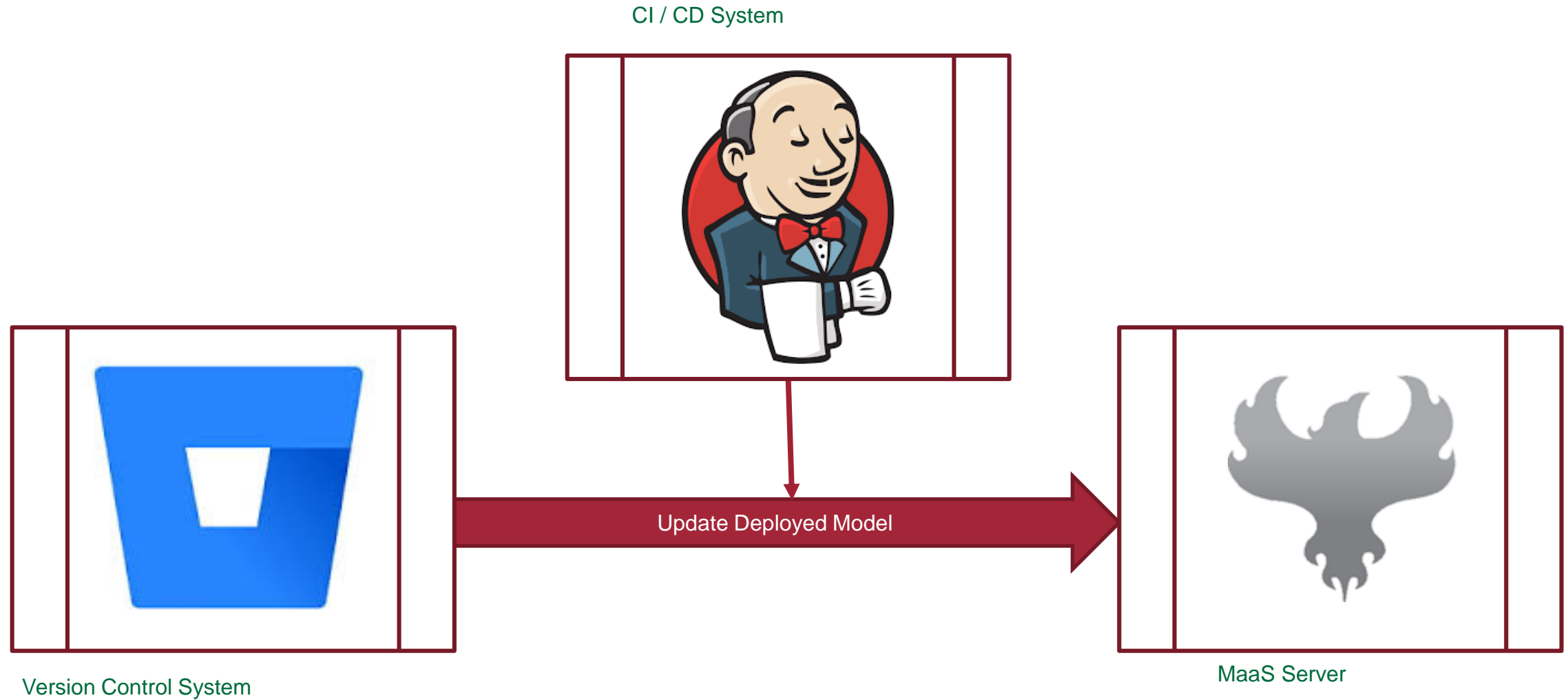
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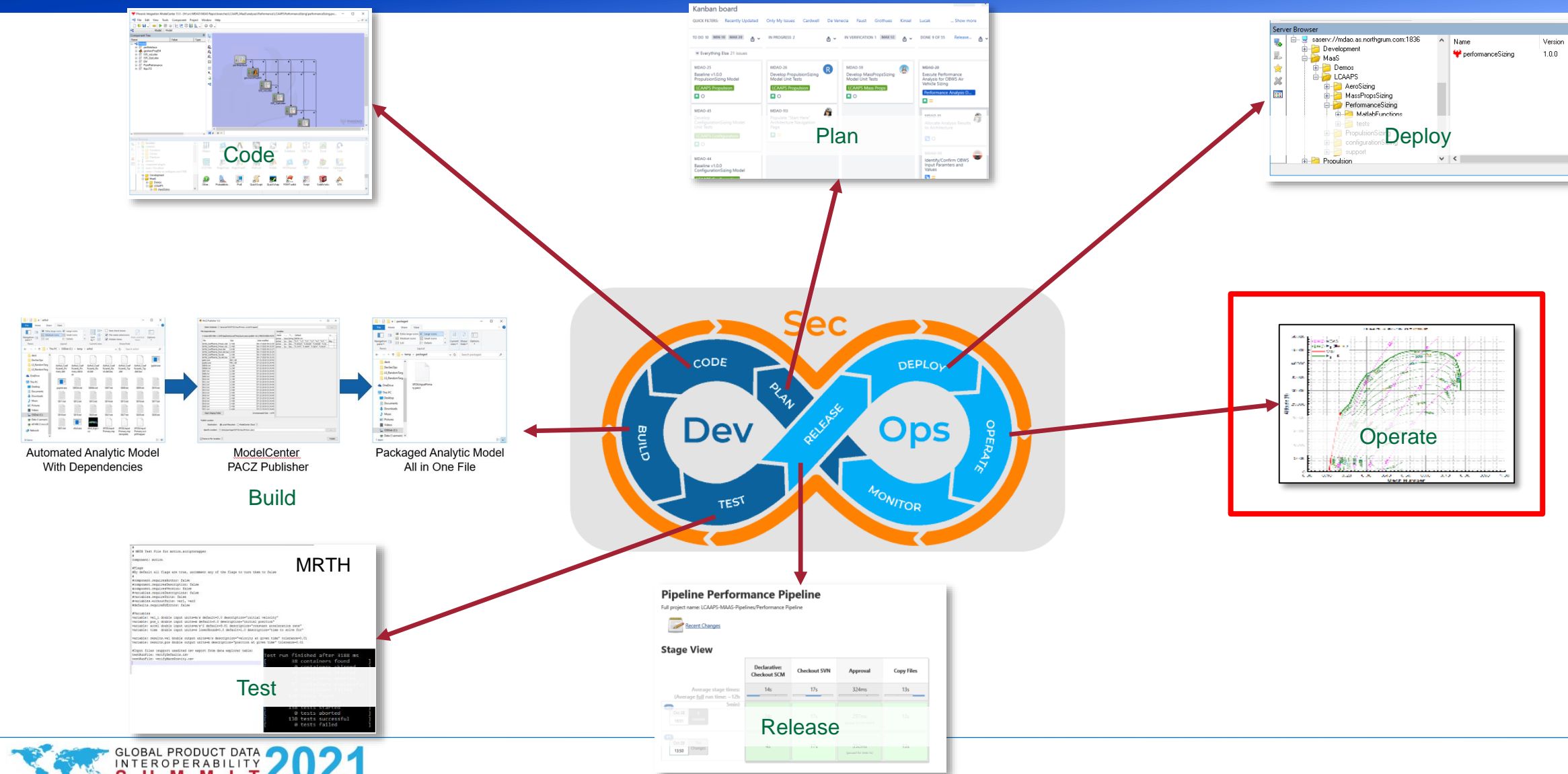


Deploy

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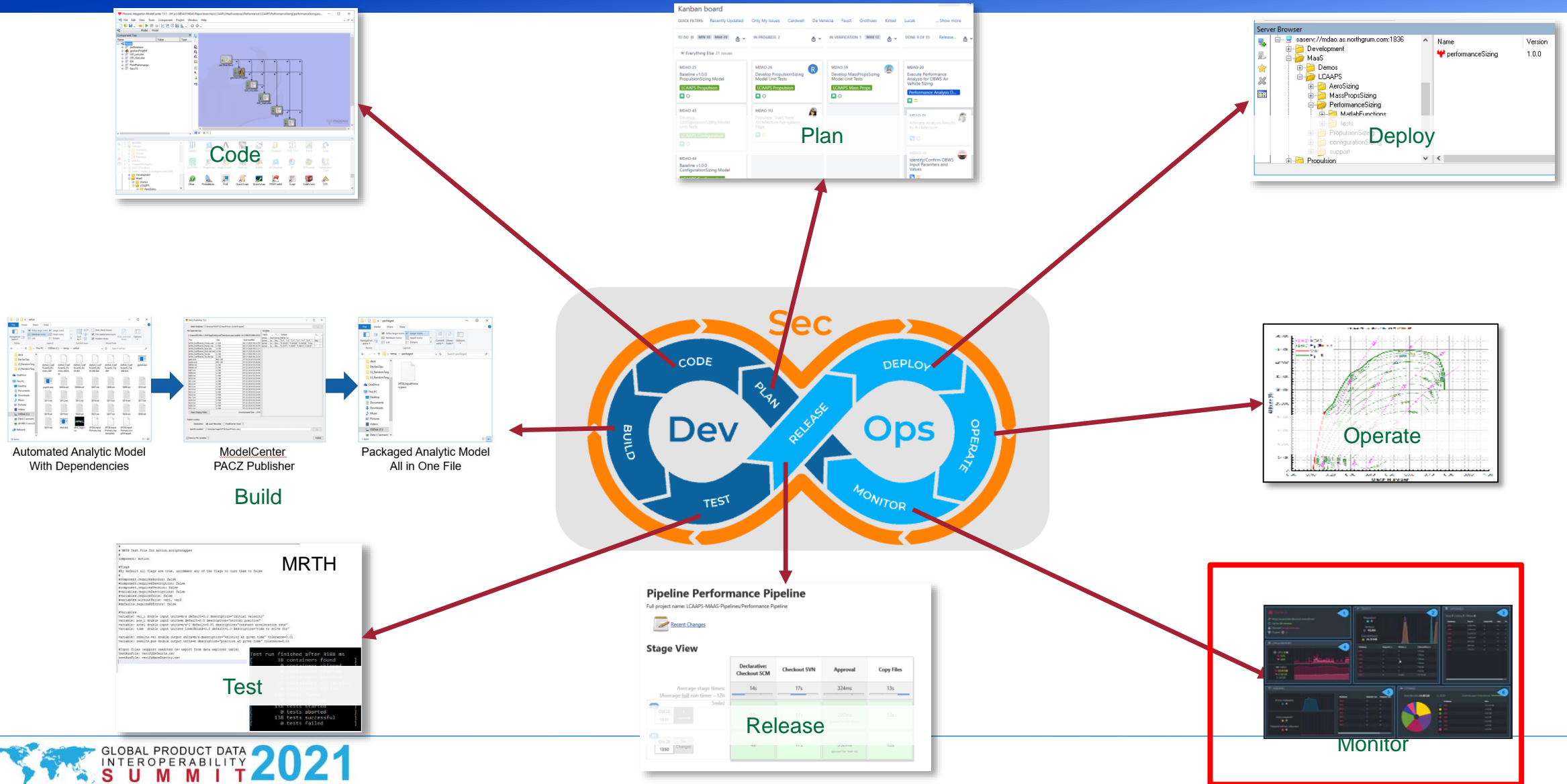
Operate

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The screenshot displays the Phoenix Integration ModelCenter 13.5 interface. The main workspace shows a model diagram with components like ConfigPreproc, PropulsionSizing, Conversions1, ConfigurationSizing, Conversions2, MassPropsSizing (highlighted with a black box), AeroSizing, Conversions3, and performanceSizing. A red arrow labeled "Use Model" points to the MassPropsSizing component in the diagram. The left pane shows the Component Tree with MassPropsSizing selected. The right pane shows the Component Properties dialog for MassPropsSizing, with the Source field containing the remote server address: saserv://mdao.as.northgrum.com/MaaS/L/... A red arrow labeled "Remote server address" points to this field. At the bottom, the Server Browser pane shows a folder structure with MassPropsS... highlighted, and a red arrow labeled "Model Available" points to it.

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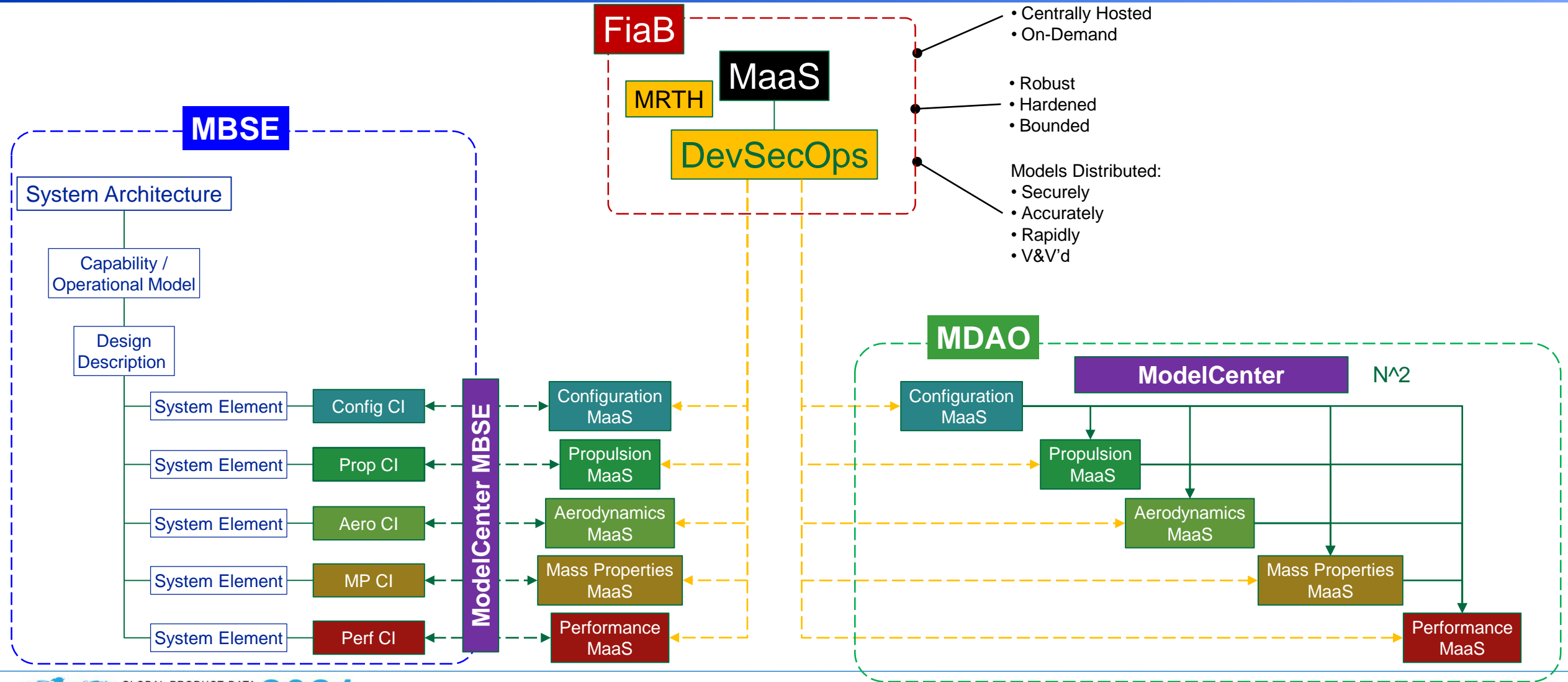
Monitor

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MaaS+DevSecOps Serves Both MBSE and MDAO

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What do you think?

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