



# **Tales from the Trenches: *Challenges of Data Analytics in a DevSecOps Program***

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**ICEAA 2023**

**Proven  
Professionals**

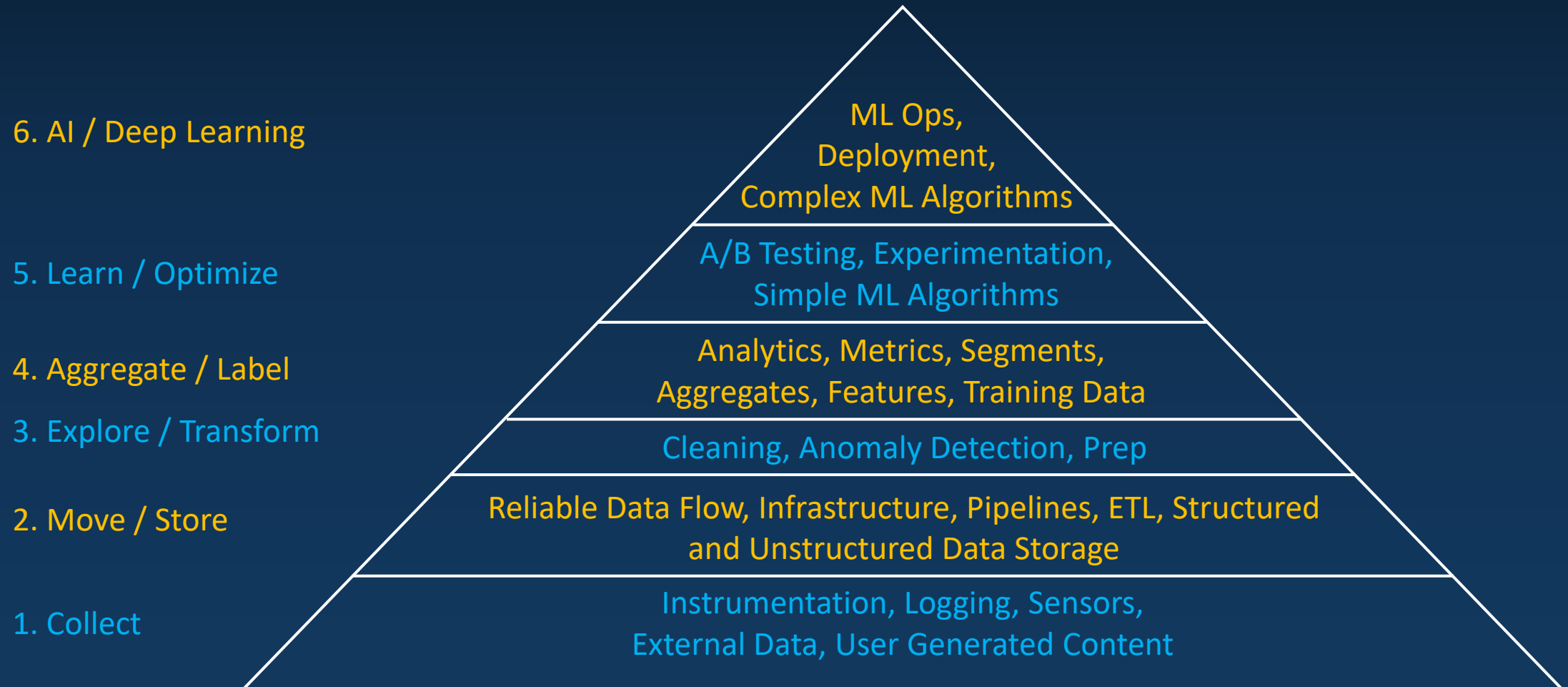
**Proven  
Results**



## Outline

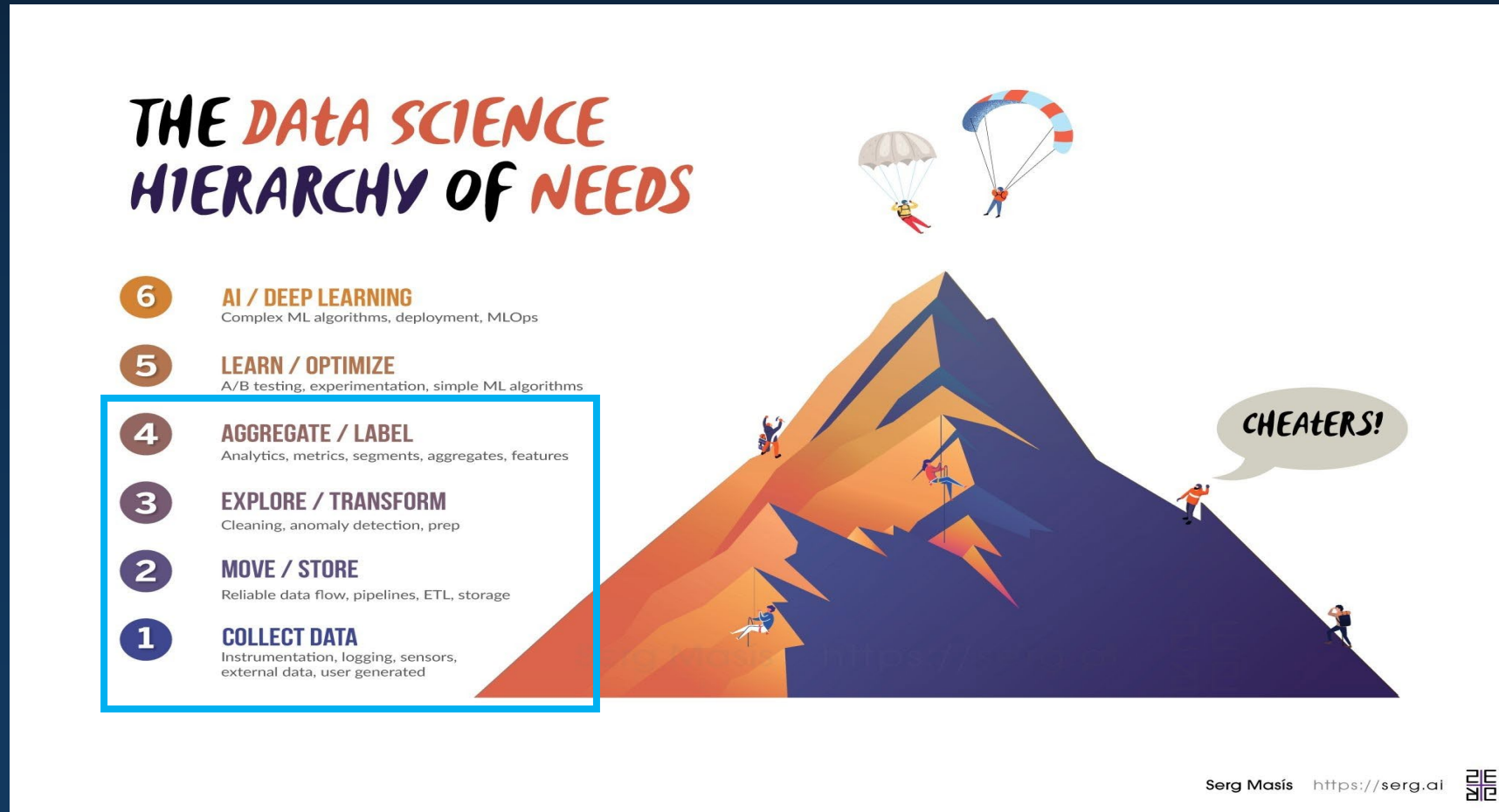
- Data Science Hierarchy
- Project Background
  - Tales
  - Goals
- Agile Databases
  - Collecting
  - Moving / Storing
  - Exploring / Transforming
  - Labeling / Aggregating
- Outcomes
  - Roadmaps
- Conclusion
  - Recommendations

# Data Science Hierarchy of Needs



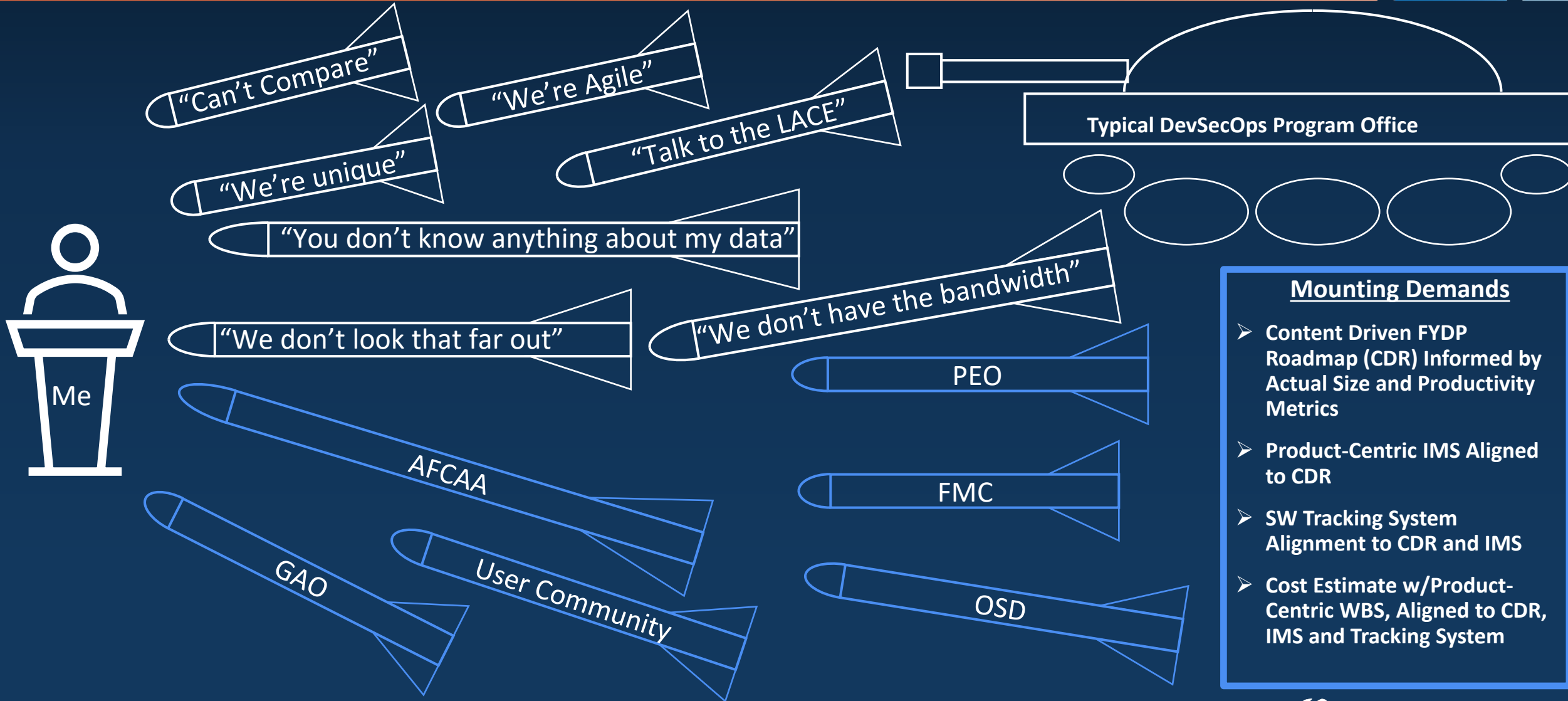
In order to reach the top, we need to start with the basics

# Data Science Hierarchy of Needs



Today's focus: Journey through 4 steps using Agile Data

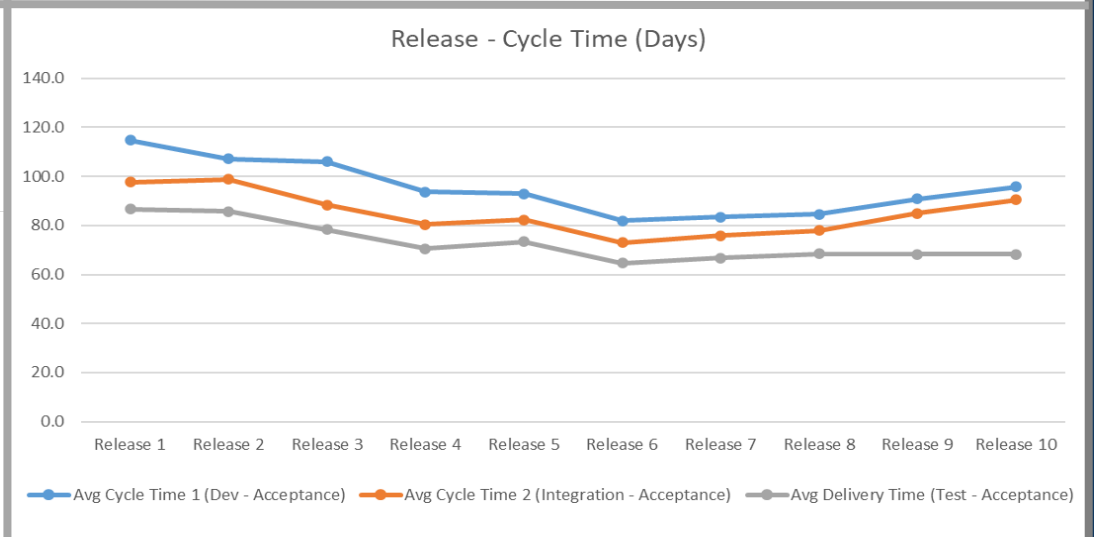
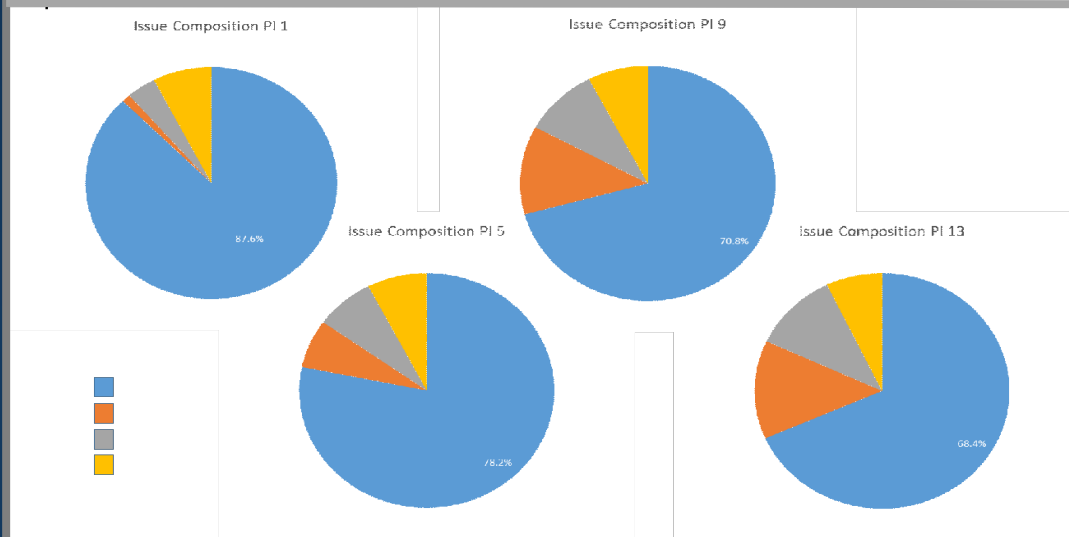
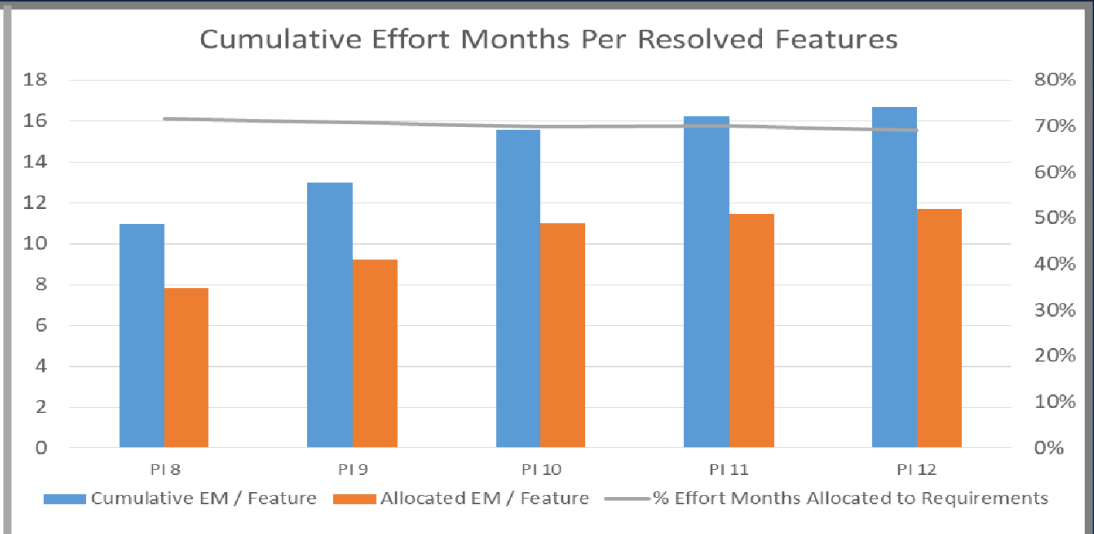
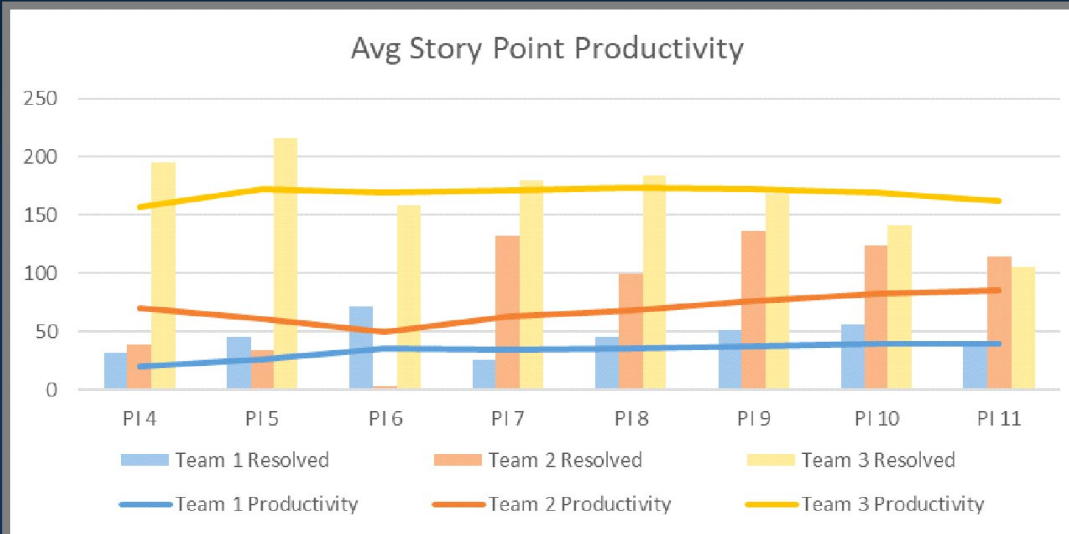
# Tales from the Trenches



# Analysis – Goals – Content Driven Roadmap

Content Driven Roadmap (CDR): Team X PO = XXX, SM = XXX, Proxy PO = XXX						*EM = Effort Months, 1 FTE has 12 EM in 1 Year														
FY23			FY24			FY25			FY26			FY27			FY28			FY29		
Total Team Size (FTE)	FTEs	EM	Total Team Size (FTE)	FTEs	EM	Total Team Size (FTE)	FTEs	EM	Total Team Size (FTE)	FTEs	EM	Total Team Size (FTE)	FTEs	EM	Total Team Size (FTE)	FTEs	EM	Total Team Size (FTE)	FTEs	EM
13.00	13.00	156.00	12.33	12.33	148.00	15.67	15.67	188.00	10.67	10.67	128.00	13.00	13.00	156.00	13.00	13.00	156.00	13.00	13.00	156.00
<b>Line of Effort #1: Product Management</b>			<b>Line of Effort #1: Product Management</b>			<b>Line of Effort #1: Product Management</b>			<b>Line of Effort #1: Product Management</b>			<b>Line of Effort #1: Product Management</b>			<b>Line of Effort #1: Product Management</b>			<b>Line of Effort #1: Product Management</b>		
<b>LOE #1 Total</b>	<b>1.00</b>	<b>12.00</b>	<b>LOE #1 Total</b>	<b>1.00</b>	<b>12.00</b>	<b>LOE #1 Total</b>	<b>1.00</b>	<b>12.00</b>	<b>LOE #1 Total</b>	<b>1.00</b>	<b>12.00</b>	<b>LOE #1 Total</b>	<b>1.00</b>	<b>12.00</b>	<b>LOE #1 Total</b>	<b>1.00</b>	<b>12.00</b>	<b>LOE #1 Total</b>	<b>1.00</b>	<b>12.00</b>
Product Owner	1.00	12.00	Product Owner	1.00	12.00	Product Owner	1.00	12.00	Product Owner	1.00	12.00	Product Owner	1.00	12.00	Product Owner	1.00	12.00	Product Owner	1.00	12.00
<b>Line of Effort #2: Software Development</b>			<b>Line of Effort #2: Software Development</b>			<b>Line of Effort #2: Software Development</b>			<b>Line of Effort #2: Software Development</b>			<b>Line of Effort #2: Software Development</b>			<b>Line of Effort #2: Software Development</b>			<b>Line of Effort #2: Software Development</b>		
<b>LOE #2 Total</b>	<b>10.50</b>	<b>126.00</b>	<b>LOE #2 Total</b>	<b>9.83</b>	<b>118.00</b>	<b>LOE #2 Total</b>	<b>13.17</b>	<b>158.00</b>	<b>LOE #2 Total</b>	<b>8.17</b>	<b>98.00</b>	<b>LOE #2 Total</b>	<b>10.50</b>	<b>126.00</b>	<b>LOE #2 Total</b>	<b>10.50</b>	<b>126.00</b>	<b>LOE #2 Total</b>	<b>10.50</b>	<b>126.00</b>
<b>LOE #2 - Capability Enhancements</b>	<b>8.50</b>	<b>102.00</b>	<b>LOE #2 - Capability Enhancements</b>	<b>7.83</b>	<b>94.00</b>	<b>LOE #2 - Capability Enhancements</b>	<b>11.17</b>	<b>134.00</b>	<b>LOE #2 - Capability Enhancements</b>	<b>6.17</b>	<b>74.00</b>	<b>LOE #2 - Capability Enhancements</b>	<b>8.50</b>	<b>102.00</b>	<b>LOE #2 - Capability Enhancements</b>	<b>8.50</b>	<b>102.00</b>	<b>LOE #2 - Capability Enhancements</b>	<b>8.50</b>	<b>102.00</b>
GUI Improvements	2.00	24.00	GUI Improvements	2.00	24.00	GUI Improvements	2.00	24.00	GUI Improvements	2.00	24.00	GUI Improvements	2.00	24.00	GUI Improvements	2.00	24.00	GUI Improvements	2.00	24.00
New Data Ingest	6.50	78.00	New Data Visualization	4.17	50.00	New Data Ingest 1	4.58	55.00	New Data Visualization	4.17	50.00	TBD Enhancement	6.50	78.00	TBD Enhancement	6.50	78.00	TBD Enhancement	6.50	78.00
			Automation Improvements	1.67	20.00	New Data Ingest 2	4.58	55.00												
<b>LOE #2 - Deficiency Resolution</b>	<b>2.00</b>	<b>24.00</b>	<b>LOE #2 - Deficiency Resolution</b>	<b>2.00</b>	<b>24.00</b>	<b>LOE #2 - Deficiency Resolution</b>	<b>2.00</b>	<b>24.00</b>	<b>LOE #2 - Deficiency Resolution</b>	<b>2.00</b>	<b>24.00</b>	<b>LOE #2 - Deficiency Resolution</b>	<b>2.00</b>	<b>24.00</b>	<b>LOE #2 - Deficiency Resolution</b>	<b>2.00</b>	<b>24.00</b>	<b>LOE #2 - Deficiency Resolution</b>	<b>2.00</b>	<b>24.00</b>
Quarterly DRs - 1	0.50	6.00	Quarterly DRs - 1	0.50	6.00	Quarterly DRs - 1	0.50	6.00	Quarterly DRs - 1	0.50	6.00	Quarterly DRs - 1	0.50	6.00	Quarterly DRs - 1	0.50	6.00	Quarterly DRs - 1	0.50	6.00
Quarterly DRs - 2	0.50	6.00	Quarterly DRs - 2	0.50	6.00	Quarterly DRs - 2	0.50	6.00	Quarterly DRs - 2	0.50	6.00	Quarterly DRs - 2	0.50	6.00	Quarterly DRs - 2	0.50	6.00	Quarterly DRs - 2	0.50	6.00
Quarterly DRs - 3	0.50	6.00	Quarterly DRs - 3	0.50	6.00	Quarterly DRs - 3	0.50	6.00	Quarterly DRs - 3	0.50	6.00	Quarterly DRs - 3	0.50	6.00	Quarterly DRs - 3	0.50	6.00	Quarterly DRs - 3	0.50	6.00
Quarterly DRs - 4	0.50	6.00	Quarterly DRs - 4	0.50	6.00	Quarterly DRs - 4	0.50	6.00	Quarterly DRs - 4	0.50	6.00	Quarterly DRs - 4	0.50	6.00	Quarterly DRs - 4	0.50	6.00	Quarterly DRs - 4	0.50	6.00
<b>Line of Effort #3: Integration &amp; Test Support</b>			<b>Line of Effort #3: Integration &amp; Test Support</b>			<b>Line of Effort #3: Integration &amp; Test Support</b>			<b>Line of Effort #3: Integration &amp; Test Support</b>			<b>Line of Effort #3: Integration &amp; Test Support</b>			<b>Line of Effort #3: Integration &amp; Test Support</b>			<b>Line of Effort #3: Integration &amp; Test Support</b>		
<b>LOE #3 Total</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 Total</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 Total</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 Total</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 Total</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 Total</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 Total</b>	<b>0.75</b>	<b>9.00</b>
<b>LOE #3 - Activity A</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 - Activity A</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 - Activity A</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 - Activity A</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 - Activity A</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 - Activity A</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 - Activity A</b>	<b>0.75</b>	<b>9.00</b>
Reachback Support	0.25	3.00	Reachback Support	0.25	3.00	Reachback Support	0.25	3.00	Reachback Support	0.25	3.00	Reachback Support	0.25	3.00	Reachback Support	0.25	3.00	Reachback Support	0.25	3.00
Documentation Updates	0.50	6.00	Documentation Updates	0.50	6.00	Documentation Updates	0.50	6.00	Documentation Updates	0.50	6.00	Documentation Updates	0.50	6.00	Documentation Updates	0.50	6.00	Documentation Updates	0.50	6.00
<b>Line of Effort #4: Training Support</b>			<b>Line of Effort #4: Training Support</b>			<b>Line of Effort #4: Training Support</b>			<b>Line of Effort #4: Training Support</b>			<b>Line of Effort #4: Training Support</b>			<b>Line of Effort #4: Training Support</b>			<b>Line of Effort #4: Training Support</b>		
<b>LOE #3 Total</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 Total</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 Total</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 Total</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 Total</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 Total</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 Total</b>	<b>0.75</b>	<b>9.00</b>
<b>LOE #3 - Activity A</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 - Activity A</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 - Activity A</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 - Activity A</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 - Activity A</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 - Activity A</b>	<b>0.75</b>	<b>9.00</b>	<b>LOE #3 - Activity A</b>	<b>0.75</b>	<b>9.00</b>
User Training	0.25	3.00	User Training	0.25	3.00	User Training	0.25	3.00	User Training	0.25	3.00	User Training	0.25	3.00	User Training	0.25	3.00	User Training	0.25	3.00
Documentation Updates	0.50	6.00	Documentation Updates	0.50	6.00	Documentation Updates	0.50	6.00	Documentation Updates	0.50	6.00	Documentation Updates	0.50	6.00	Documentation Updates	0.50	6.00	Documentation Updates	0.50	6.00
<b>Total Mapped EM</b>	<b>13.00</b>	<b>156.00</b>	<b>Total Mapped EM</b>	<b>12.33</b>	<b>148.00</b>	<b>Total Mapped EM</b>	<b>15.67</b>	<b>188.00</b>	<b>Total Mapped EM</b>	<b>10.67</b>	<b>128.00</b>	<b>Total Mapped EM</b>	<b>13.00</b>	<b>156.00</b>	<b>Total Mapped EM</b>	<b>13.00</b>	<b>156.00</b>	<b>Total Mapped EM</b>	<b>13.00</b>	<b>156.00</b>

# Analysis – Goals – Agile Metrics (Process, Product, Quality, DevSecOps)





## Collect Data – DevSecOps Example

- Jira is a software Project Tracking Tool developed by Atlassian that is widely used throughout DoD for Agile DevSecOps projects
  - Available through Platform One
  - Enables SWP policy requirements
  - Allows automation
- Project data can be extracted in multiple formats for analysis (including .CSV for Excel)
  - Requires access to appropriate Jira workspace
  - Data searchable by Project Key (and additional parameters)
    - Leverage Jira SME if needed

**Era of not providing data for Agile Software programs is gone  
Interest in Requirements Traceability, Software Productivity from PEOs, GAO, AFCAA, etc.**



## Collect Data – DevSecOps Example

- Project includes 17 SW Dev and I&T Teams
- Collect - Received access to 17 unique Project workspaces within Jira
  - Goal 1: Create Database of Team-specific Product data (Epics, Features) to use as analogies for future requirements; pair with future Roadmap of requirements to enable decision support analysis
  - Goal 2: Create Team-specific Metrics (Process, Product, Quality, DevSecOps, etc.) in alignment with DoDI 5000.87 policy
- Move/Store - Extracted 17 unique Project workspaces data into Excel for Analysis; stored on Shared Drive
- Explore/Transform – Cleaned and prepared data for Analysis
  - Fewer Epics and Features completed than expected
- Aggregate/Label – Created team specific Product Metrics (Epic Delivery, Feature Delivery, Story Delivery) and Process Metrics (Velocity)
  - Note: Story Points do not indicate Capability Delivery and are interesting as a Process Metric (Velocity) but not as a Product Metric
- Ready for Review with Teams!

## Collect Data – DevSecOps Example



## Collect Data – DevSecOps Example

- 17 SW Dev and I&T Teams tracked lower-level workload (Stories, Tasks, etc.) in individual workspaces; major Products (Epics, Features) transitioned to tracking within Over-arching Program Board
- Collect - Received access to Over-arching Program Board
  - Goal 1: Create Database of Team-specific Product data (Epics, Features) to use as analogies for future requirements; pair with future Roadmap of requirements to enable decision support analysis
  - Goal 2: Create Team-specific Metrics (Process, Product, Quality, DevSecOps, etc.) in alignment with DoDI 5000.87 policy
- Move/Store - Extracted 1 Over-arching Program Board and all linked Issues (Stories, Tasks, etc.) from 17 individual workspaces into consolidated workbook
- Explore/Transform – Cleaned and prepared data for Analysis
- Aggregate/Label – Created team specific Product Metrics (Epic Delivery, Feature Delivery, Story Delivery) and Process Metrics (Velocity)

# Move/Store Data – DevSecOps Example

**EGS Initiatives Export Reference** Save as Details ★

Search: `project = EGS AND issueType in (Initiative, Epic) OR issueFunction in issuesInEpics('Project = EGS and issueType in (epic)') ORDER BY Rank ASC` Search Basic Columns

Key	Story Points	Epic Link	Assigned Team	Components	Labels	Links	Original story points	Created	Resolved	Parent Link	Regional Team	Satisfaction	Story Point/s	Tasked Team
EGS-7394	3	PI 2022-4: CloudSIL Environments deployment, integration, & testing		EGS Core CI/CD	None	EGS-7382, EGS-7395		18/Jan/23				No permission		
EGSPAAS-3425	3	PI 2022-4: Hybrid Cloud and Infrastructure Improvements			None	EGSPAAS-3399, EGSPAAS-3455		20/Jan/23	06/Feb/23			No permission		
EGSPAAS-3369	3	PI 2022-4: Hybrid Cloud and Infrastructure Improvements			2022-4: Cloud Hybrid Improvements Infrastructure and	EGSPAAS-3347, EGSPAAS-3396		05/Dec/22				No permission		
EGSPAAS-3384	3	PI 2022-4: Hybrid Cloud and Infrastructure Improvements			None	EGSPAAS-3399, EGSPAAS-3351		16/Dec/22	03/Jan/23			No permission		
EGSCM-1271		PI2023-1: CM Controls and Improvements		Baseline Management	None			02/Feb/23				No permission		
EGSCM-893		PI2023-1: CM Controls and Improvements		Governance and Documentation	None			28/Feb/22				No permission		

Data exported using command to return all Epics (Features) and associated Issues

## Explore/Transform Data – DevSecOps Example

- Over-arching Program board is user-input by multiple teams
  - Challenge 1: Isolating Products (Epics, Features) to a Specific Team
    - Reminder: Team velocity and workload decomposition is Team-specific and should not be compared or applied across Teams
    - Option 1: Use Team Field
      - Often Blank, sometimes Numerical Team Number (Team = 193)
      - Additional complexity of receiving Team Number to Name traceability, Out of Date Team Names/Numbers, Team Re-Orgs

Issue key	Issue id	Custom field (Epic Link)	PI Resolved	Issue Type	Status	Project key	Summary	Custom field (Tasked Team)	Custom field (Team)	Custom field (Team Name)
EGS-3195	131769		PI 2021-4	Epic	Done	EGS			204	
EGS-2247	81613		PI 2021-3	Epic	Done	EGS			199	
EGS-900	80373		PI 2020-3	Epic	Done	EGS				
EGS-918	80389		PI 2020-3	Epic	Done	EGS				
EGS-919	80390		PI 2020-3	Epic	Done	EGS				
EGS-921	80392		PI 2020-3	Epic	Done	EGS				
EGS-922	80393		PI 2020-3	Epic	Done	EGS				
EGS-18	79755		PI 2020-2	Epic	Done	EGS				
EGS-19	79756		PI 2020-1	Epic	Done	EGS				
EGS-20	79757		PI 2020-1	Epic	Done	EGS				
EGS-21	79758		PI 2020-1	Epic	Done	EGS				
EGS-22	79759		PI 2020-2	Epic	Done	EGS				
EGS-23	79760		PI 2020-2	Epic	Done	EGS				

# Explore/Transform Data – DevSecOps Example

- Over-arching Program board is user-input by multiple teams
  - Challenge 1: Isolating Products (Epics, Features) to a Specific Team
    - Reminder: Team velocity and workload decomposition is Team-specific and should not be compared or applied across Teams
    - Option 2: Use Project Key of children Issues when able
      - Sometimes no children
      - Sometimes multiple project key worth of children

Issue key	Issue id	Custom field (Epic Link)	PI Resolved	Issue Type	Status	Project key	Summary	Custom field (Tasked Team)	Custom field (Team Name)	Custom field (Team Name)
EGSEAS-93	30234	EGS-6091	PI 2022-2	Task	Done	EGSEAS				
EGSPAAS-2838	62767	EGS-6106	PI 2022-2	Story	Done	EGSPAAS				
EGSPAAS-2836	62767	EGS-6107	PI 2022-2	Story	Done	EGSPAAS				
EGSSA-71	47978	EGS-6104	PI 2022-2	Task	Done	EGSSA				194
EGSSA-97	47969	EGS-6104	PI 2022-2	Task	Done	EGSSA				
EGSPAAS-2585	45235	EGS-6107	PI 2022-2	Task	Done	EGSPAAS				194
EGSPAAS-2619	47485	EGS-6105	PI 2022-2	Story	Done	EGSPAAS				194
EGSPAAS-2639	47757	EGS-6102	PI 2022-2	Story	Done	EGSPAAS				194
EGSEAS-236	45251	EGS-6091	PI 2022-2	Task	Done	EGSEAS				
EGSEAS-255	46920	EGS-6091	PI 2022-2	Story	Done	EGSEAS				
EGSEAS-266	46956	EGS-6091	PI 2022-2	Task	Done	EGSEAS				
EGSEAS-182	40795	EGS-6091	PI 2022-2	Story	Done	EGSEAS				
EGSEAS-282	50629	EGS-6091	PI 2022-2	Task	Done	EGSEAS				
EGSGRICC-5317	44771	EGS-5423	PI 2022-1	Story	Done	EGSGRICC				188
EGSGRICC-4838	39537	EGS-5477	PI 2022-1	Task	Done	EGSGRICC				188
EGSGRICC-5783	47758	EGS-6054	PI 2022-2	Story	Done	EGSGRICC				188
EGSGRICC-5782	47758	EGS-6054	PI 2022-2	Story	Done	EGSGRICC				188
EGSGRICC-5773	47756	EGS-6076	PI 2022-2	Story	Done	EGSGRICC				188



## Explore/Transform Data – DevSecOps Example

- Over-arching Program board is user-input by multiple teams
  - Challenge 1: Isolating Products (Epics, Features) to a Specific Team
    - Reminder: Team velocity and workload decomposition is Team-specific and should not be compared or applied across Teams
    - Option 3: Use Summary Descriptions

Issue key	Issue id	Custom field (Epic Link)	PI Resolved	Issue Type	Status	Project key	Summary	Custom field (Tasked Team)	Custom field (Team)	Custom field (Team Name)
EGS-28	79765		PI 2020-4	Epic	Done	EGS	GRS -			
EGS-29	79766		PI 2020-4	Epic	Done	EGS	GRS -			
EGS-30	79767		PI 2020-4	Epic	Done	EGS	GRS -			
EGS-31	79768		PI 2020-2	Epic	Done	EGS	GRS -			
EGS-33	79770		PI 2020-2	Epic	Done	EGS	GRM			
EGS-34	79771		PI 2020-2	Epic	Done	EGS	GRM			
EGS-35	79772		PI 2020-2	Epic	Done	EGS	GRM			
EGS-36	79773		PI 2020-2	Epic	Done	EGS	GRM			
EGS-37	79774		PI 2020-2	Epic	Done	EGS	GRM			
EGS-38	79775		PI 2020-4	Epic	Done	EGS	TREx			
EGS-39	79776		PI 2020-2	Epic	Done	EGS	TREx			
EGS-41	79778		PI 2020-4	Epic	Done	EGS	TREx			
EGS-43	79780		PI 2020-4	Epic	Done	EGS	TREx			
EGS-44	79781		PI 2020-2	Epic	Done	EGS				
EGS-45	79782		PI 2020-2	Epic	Done	EGS				
EGS-46	79783		PI 2020-4	Epic	Done	EGS				
EGS-47	79784		PI 2020-2	Epic	Done	EGS				

- Lesson Learned: Review all results with individual Teams; advise Teams what information is important for data analysis (through LACE, collaboration opportunities, etc.)



## Explore/Transform Data – DevSecOps Example

- Over-arching Program board is user-input by multiple teams
  - **Challenge 2: Multi-Team Epics**
    - Epics supported by multiple teams required portions of effort (Stories, Tasks) applied to appropriate teams

Issue key	Issue id	Custom field (Epic Link)	PI Resolved	Issue Type	Status	Project key	Summary	Custom field (Tasked Team)	Custom field (Team Name)	Custom field (Team Name)
EGSGRICC-2358	66704	EGS-2090	PI 2021-2	Story	Done	EGSGRICC				188
EGSEMA-2409	70015	EGS-2090	PI 2021-2	Task	Done	EGSEMA				192
EGSS-392	75520	EGS-2090	PI 2021-2	Task	Done	EGSS				191
EGSS-395	75520	EGS-2090	PI 2021-2	Task	Done	EGSS				191
EGSS-399	75520	EGS-2090	PI 2021-2	Task	Done	EGSS				191
EGSS-400	75520	EGS-2090	PI 2021-2	Task	Done	EGSS				191
EGSS-401	75520	EGS-2090	PI 2021-2	Task	Done	EGSS				191
EGSS-451	75578	EGS-2090	PI 2021-2	Task	Done	EGSS				191
EGSPAAS-1182	76591	EGS-2090	PI 2021-2	Story	Done	EGSPAAS				194

- Lesson Learned: Advise Teams of how workload decomposition or roll-up impacts ability to isolate and perform data analysis

## Explore/Transform Data – DevSecOps Example

- Over-arching Program board is user-input by multiple teams
  - Challenge 3: Sizing Epics
    - Fairly easy for Single-Team Epics
    - Multi-Team Epics require more manual touch

Issue key	Final Team	Sizing Total (Issues)	Issue	PI Resolv	Issue Ty	Status	Project k	Summary
EGS-1059	Hardened Operating System	2	80523	PI 2021-3	Epic	Done	EGS	
EGS-1060	Energizer	31	80524	PI 2021-1	Epic	Done	EGS	
EGS-1087	Energizer	4	80551	PI 2020-4	Epic	Done	EGS	
EGS-1091	Energizer	1	80555	PI 2020-4	Epic	Done	EGS	
EGS-1092	Software Development Kit	4	80556	PI 2020-4	Epic	Done	EGS	
EGS-1093	Software Development Kit	3	80557	PI 2020-4	Epic	Done	EGS	
EGS-1094	GRI Core Components	18	80558	PI 2021-2	Epic	Done	EGS	
EGS-1096	Platform as a Service	1	80560	PI 2020-4	Epic	Done	EGS	
EGS-1100	GRI Core Components	1	80564	PI 2020-3	Epic	Done	EGS	
EGS-1101	GRI Core Components	1	80565	PI 2021-1	Epic	Done	EGS	
EGS-1107	GRI Core Components	2	80571	PI 2021-2	Epic	Done	EGS	
EGS-1109	Mission Integration	1	80573	PI 2020-4	Epic	Done	EGS	
EGS-1110	Mission Integration	1	80574	PI 2020-4	Epic	Done	EGS	
EGS-113	Ground Resource Manager	1	79834	PI 2020-1	Epic	Done	EGS	
EGS-2090	Multi (EMA, GRICC, PAAS, SS)	13	81465	PI 2021-2	Epic	Done	EGS	
EGS-2114	Multi (ENERGIZ, GRICC)	60	81488	PI 2021-2	Epic	Done	EGS	
EGS-2115	Multi (ENERGIZ, GRICC)	24	81489	PI 2021-3	Epic	Done	EGS	

- Lesson Learned: Software Tools / Jira plugins allow for easier automation of this process

# Explore/Transform Data – DevSecOps Example

- Over-arching Program board is user-input by multiple teams
  - **Challenge 4: Obtaining an applicable data range for analysis**
    - Teams change, merge, and morph over time; need to have enough data that is applicable for future analysis available
    - Lesson Learned: Integrate with Product Teams and understand applicability of available data; thoroughly explain purpose and goals of analysis to receive Leadership and Team support in completing

Row Labels	PI 2020-1	PI 2020-2	PI 2020-3	PI 2020-4	PI 2021-1	PI 2021-2	PI 2021-3	PI 2021-4	PI 2022-1	PI 2022-2	PI 2022-3	Unresolved	Grand Total
<b>Epic</b>	0	3	13	11	13	17	19	8	10	6		143	2121
<b>Done</b>	0	3	13	11	13	17	19	8	10	6			1313
<b>Software</b>	0	3	13	11	13	17	19	8	10	6			581
<b>GRI Core Components</b>	0	3	13	11	12	16	16	6	3	3			83
Enterprise:							1						1
Enterprise:							1						1
Enterprise:						1							1
Enterprise:							1						1
Enterprise:							1						1
GNOME:							1						1
GRI-CC								1					1
GRI-CC			1		1								2
GRI-CC					1								1
HOME:						1							1
HOME:						1							1
HOME:						1							1
HOME:								1					1
HOME:								1					1
HOME:									1				1
HOME:										1			1
MP:							1						1
MP:									1				1

**Notes:**

- Initial Program Increments (PIs) N/A as teams stand up
- PI 2020-3 through PI 2021-3 N/A as multiple teams shared single Jira board and associated Project Key
  - Inability to isolate Team-specific Data
- Recent data PI 2021-4 through PI 2022-2 applicable to future efforts
- Worked with team to establish cleaner traceability going forward

# Aggregate/Label Data – DevSecOps Example

- Created Team-Specific Product Metrics (Epic Delivery, Feature Delivery)
  - Aggregated data by pairing with Team Cost/Hours data
  - Created database of Hours per Feature, Feature Sizing/Complexity

GRI Core Components - Recent Completed Features (Jira Epics)	Line of Effort	PI 2021-3	PI 2021-4	PI 2022-1	PI 2022-2	Size	Size	Effort Month
Enterprise:	Automation	1				44	M	4.9
Enterprise:	Automation	1				13	VS	1.5
Enterprise:	Automation	1				4	VS	0.4
Enterprise:	Automation	1				1	VS	0.1
GRI-CC	Core Capability	1				1	VS	0.1
HOME:	MC Updates		1			48	M	5.4
HOME:	MC Updates		1			167	XL	18.7
MP:	SWC I&T		1			10	VS	1.1
MP:	SWC I&T	1				22	S	2.5
MP:	SWC I&T		1			16	VS	1.8
MP:	SWC I&T		1			31	S	3.5
MW:	MC Updates	1				1	VS	0.1
MW:	MC Updates	1				1	VS	0.1
Phase 1	Major Enhancement				1	5	VS	0.6
Phase 1	Major Enhancement		1			5	VS	0.6
Support	SWC I&T			1		20	S	2.2
Support	SWC I&T			1		13	VS	1.5
Deliver	SWC I&T			1		66	M	7.4
Deliver	SWC I&T				1	96	L	10.7
Deploy	SWC I&T					3	VS	0.3
Deploy	SWC I&T				1	85	L	9.5
HOME:	MC Updates		1			83	L	9.3
HOME:	MC Updates	1				29	S	3.2
MP:	SWC I&T	1				17	VS	1.9
Phase 1+	Major Enhancement				1	48	M	5.4
Phase 1+	Major Enhancement				1	7	VS	0.8
HOME	MC Updates				1	171	XL	19.1
Phase 1+	Major Enhancement				1	102	XL	11.4
						<b>1710</b>		<b>191.46</b>

Key Historical Data			
Productivity Metric	Size	EM	Documentation
Very Small		8.5	0.9 Avg for Data from Last 4 PI
Small		24.6	2.8 Avg for Data from Last 4 PI
Medium		51.4	5.8 Avg for Data from Last 4 PI
Large		86.0	9.6 Avg for Data from Last 4 PI
Extra Large		136.3	15.3 Avg for Data from Last 4 PI
Overall Avg		38.0	4.3 Avg for Data from Last 4 PI
<b>Available Effort Months @ Historical Size</b>			
Historical Effort Months (last 4 PIs)			191.5
<b>Available Effort Months @ Future Size</b>			
Z = Future Available FTEs			11.5
Available Effort Months @ Team Size Z			138.0

# Outcome - Roadmaps

- Created Team-Specific Roadmap of Scope/Requirements across FYDP
  - Paired future Roadmap activities with prior data where applicable

FY23		FY24		FY25		FY26	
Team Size (FTE)	Av Eff Mths	Team Size (FTE)	Av Eff Mths	Team Size (FTE)	Av Eff Mths	Team Size (FTE)	Av Eff Mths
11.50	138.0	11.50	138.0	13.50	162.0	13.50	162.0
SWC Integration & Test Support (50%)		SWC Integration & Test Support (50%)		SWC Integration & Test Support (50%)		SWC Integration & Test Support (50%)	
<i>SWC Capabilities &amp; DRs</i>		<i>SWC Capabilities &amp; DRs</i>		<i>SWC Capabilities &amp; DRs</i>		<i>SWC Capabilities &amp; DRs</i>	
Epic 1 : Q1	XL 15.3	Epic 1 : Q1	XL 15.3	Epic 1 : Q1	XL 15.3	Epic 1 : Q1	XL 15.3
Epic 2 : Q2	XL 15.3	Epic 2 : Q2	XL 15.3	Epic 2 : Q2	XL 15.3	Epic 2 : Q2	XL 15.3
Epic 3 : Q3	XL 15.3	Epic 3 : Q3	XL 15.3	Epic 3 : Q3	XL 15.3	Epic 3 : Q3	XL 15.3
Epic 4 : Q4	XL 15.3	Epic 4 : Q4	XL 15.3	Epic 4 : Q4	XL 15.3	Epic 4 : Q4	XL 15.3
Mission Capability Updates (15%)		Mission Capability Updates (15%)		Mission Capability Updates (15%)		Mission Capability Updates (15%)	
<i>Update Mission Capabilities &amp; Release</i>		<i>Update Mission Capabilities &amp; Release</i>		<i>Update Mission Capabilities &amp; Release</i>		<i>Update Mission Capabilities &amp; Release</i>	
Epic 5 : Q1	M 5.8	Epic 5 : Q1	M 5.8	Epic 5 : Q1	M 5.8	Epic 5 : Q1	M 5.8
Epic 6 : Q2	M 5.8	Epic 6 : Q2	M 5.8	Epic 6 : Q2	M 5.8	Epic 6 : Q2	M 5.8
Epic 7 : Q3	M 5.8	Epic 7 : Q3	M 5.8	Epic 7 : Q3	M 5.8	Epic 7 : Q3	M 5.8
Epic 8 : Q4	M 5.8	Epic 8 : Q4	M 5.8	Epic 8 : Q4	M 5.8	Epic 8 : Q4	M 5.8
Service Enhancements (20%)		Service Enhancements (20%)		Service Enhancements (20%)		Service Enhancements (20%)	
<i>Core Capabilities [10%]</i>		<i>Core Capabilities [10%]</i>		<i>Core Capabilities [10%]</i>		<i>Core Capabilities [10%]</i>	
Epic 9 : Q1	S 2.8	Epic 9 : Q1	S 2.8	Epic 9 : Q1	S 2.8	Epic 9 : Q1	S 2.8
Epic 10 : Q2	M 5.8	Epic 10 : Q2	M 5.8	Epic 10 : Q2	M 5.8	Epic 10 : Q2	M 5.8
Epic 11 : Q3	S 2.8	Epic 11 : Q3	S 2.8	Epic 11 : Q3	S 2.8	Epic 11 : Q3	S 2.8
Epic 12 : Q4	M 5.8	Epic 12 : Q4	M 5.8	Epic 12 : Q4	M 5.8	Epic 12 : Q4	M 5.8
Automation Enhancements [5%]		Automation Enhancements [5%]		Automation Enhancements [5%]		Automation Enhancements [5%]	
<i>Ops Support/Training [2.5%]</i>		<i>Ops Support/Training [2.5%]</i>		<i>Ops Support/Training [2.5%]</i>		<i>Ops Support/Training [2.5%]</i>	
Epic 17: Continuous Support/Training	VS 0.9	Epic 17: Continuous Support/Training	VS 0.9	Epic 17: Continuous Support/Training	VS 0.9	Epic 17: Continuous Support/Training	VS 0.9
Knowledge Transfer/Training [2.5%]		Knowledge Transfer/Training [2.5%]		Knowledge Transfer/Training [2.5%]		Knowledge Transfer/Training [2.5%]	
<i>Major Enhancements (15%)</i>		<i>Major Enhancements (15%)</i>		<i>Major Enhancements (15%)</i>		<i>Major Enhancements (15%)</i>	
<i>Major Enhancements</i>		<i>Major Enhancements</i>		<i>Major Enhancements</i>		<i>Major Enhancements</i>	
Epic 19: Artemis	XL 15.3	Epic 19: Future Enhancement 1 (Complete)	XL 9.1	Epic 20: Future Enhancement 2 (Complete)	XL 2.9	Epic 20: Future Enhancement 4 (Complete)	XL 12.0
Epic 20: Future Enhancement 1 (Partial)	XL 6.2	Epic 20: Future Enhancement 2 (Partial)	XL 12.4	Epic 21: Future Enhancement 3	XL 15.3	Epic 21: Future Enhancement 5 (Partial)	XL 9.5
				Epic 22: Future Enhancement 4 (Partial)	XL 3.3		
<b>Total Mapped EM</b>	<b>138.0</b>	<b>Total Mapped EM</b>	<b>138.0</b>	<b>Total Mapped EM</b>	<b>162.0</b>	<b>Total Mapped EM</b>	<b>162.0</b>

## Purpose:

- Support Program Office Decision Analysis, Trade-Offs
- Justify POM position based on required scope/content of Agile Teams
- Provide CARD data to FMC, AFCAA to support SBE, NACA, ICE processes
- Provide requirements traceability and decomposition in alignment with GAO best practices

## Conclusion - Recommendations

- Data Science is a critical part of Cost Analysis...but don't forget to start with the basics!
  - Collect data, store data, explore & transform data, aggregate data – and automate when able
- Agile data can (and should) be collected for analysis...but be cognizant of user input concerns
  - Collaborate with Teams to understand their data to maximum extent possible and use data within applicable bounds
  - Recommend best practices to facilitate data analysis working through IPTs, LACE, Program Leadership
  - Automate repeatable processes to extent possible
- Several applicable ways to use Agile data
  - Roadmaps – Tech Baselines, Scope Considerations, Decision Support Analysis
  - Metrics – Process, Product, Quality, DevSecOps

## Conclusion – Automation Example

Jira Epic Link	Epic Summary	Team Name	Feature Status	Issue Done	Issue All	%Complete (Issues)	Story Done	Story All	%Complete (Stories)	Epic Created	Epic Resolved
EGS-7064	Develop Services	EGS EMA	Done	6	6	100%	4	4	100%	12/6/2022	4/19/2023
EGS-7064	Develop Services	EGS GRICC	Done	62	62	100%	37	37	100%	12/6/2022	4/19/2023
EGS-7064	Develop Services	EGS SWC INT Team	Done	114	114	100%	64	64	100%	12/6/2022	4/19/2023
EGS-7461	Discover and Document	EGS PaaS	Backlog	0	4	0%	0	0	0%	10/3/2022	NA
EGS-7583	Tools Update	EGS SDK	Backlog	0	15	0%	0	0	0%	1/4/2023	NA
EGS-7497	Interface Development	EGS Mission Integration Branch	In Development	1	2	50%	0	1	0%	11/11/2022	NA
EGS-7497	Interface Development	EGS PaaS	In Development	0	1	0%	0	1	0%	11/11/2022	NA
EGS-7497	Interface Development	EGS SE	In Development	3	4	75%	2	3	67%	11/11/2022	NA
EGS-7497	Interface Development	EGS Technical Integration	In Development	3	4	75%	2	3	67%	11/11/2022	NA
EGS-7474	Patching	EGS Energizer	Done	3	3	100%	3	3	100%	3/2/2023	4/20/2023
EGS-7633	Demo	EGS Energizer	Done	1	1	100%	1	1	100%	2/8/2023	4/21/2023
EGS-7594	Service Offerings	EGS CLT - CloudSIL	Done	3	3	100%	3	3	100%	1/11/2023	4/28/2023
EGS-7417	Enterprise Monitoring	EGS PaaS	In Test	20	25	80%	16	18	89%	3/3/2023	NA
EGS-7417	Enterprise Monitoring	EGS Test Team	In Test	1	2	50%	1	2	50%	3/3/2023	NA
EGS-7459	Enterprise Monitoring	EGS PaaS	Done	9	9	100%	6	6	100%	3/3/2023	NA
EGS-7459	Enterprise Monitoring	EGS PaaS	Done	1	1	100%	0	0	0%	3/3/2023	NA
EGS-7460	Enterprise Storage	EGS PaaS	In Development	1	2	50%	0	2	0%	3/4/2023	NA

Lesson Learned: Integrate with RTE, Jira Admins, Jira Analytics Team



## BACKUP

## References:

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<https://www.iceaaonline.com/wp-content/uploads/2021/06/SWA05-ppt-Smith-CMP-Analyzing-the-Full-Suite-of-Agile-Metrics.pdf>
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