RSAConference2022
San Francisco & Digital | June 6 – 9

TRANSFORM

SESSION ID: **TECH-M03**

Building an Enterprise-scale DevSecOps Infrastructure: Lessons Learned

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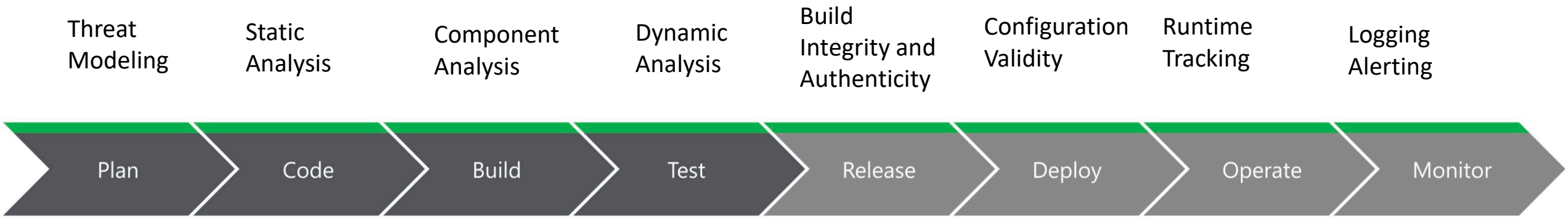
Agenda

- What is DevSecOps?
- Enterprise DevSecOps Problem Statement
- Solution Proposal and its Characteristics
- Demo!
- Learnings
- Conclusion

What is DevSecOps?

- DevSecOps is the integration of security into emerging agile IT and DevOps development (and deployment) as seamlessly and as transparently as possible (Gartner)



- Seems straightforward enough, so why do we need this session?

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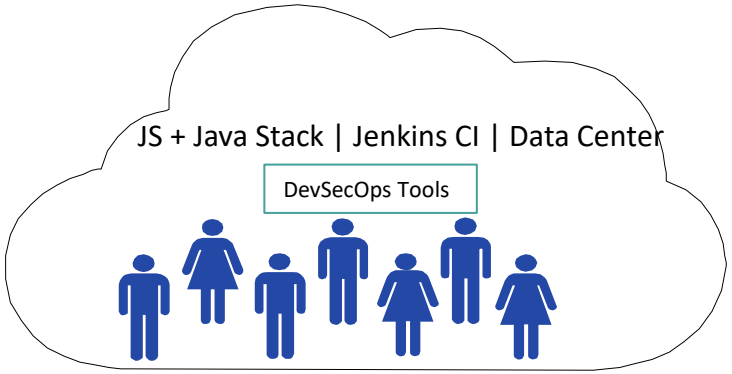
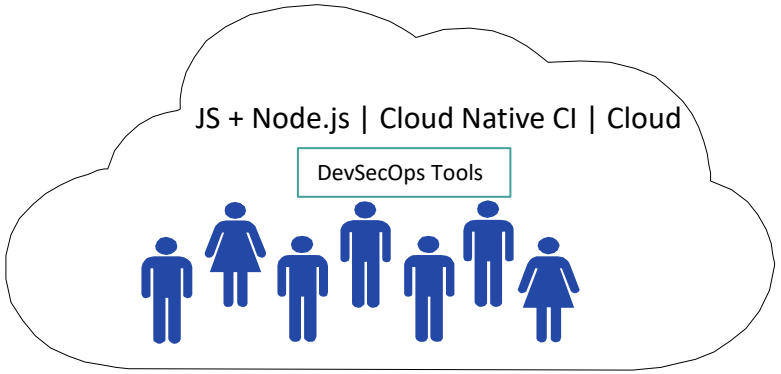
Problem Statement

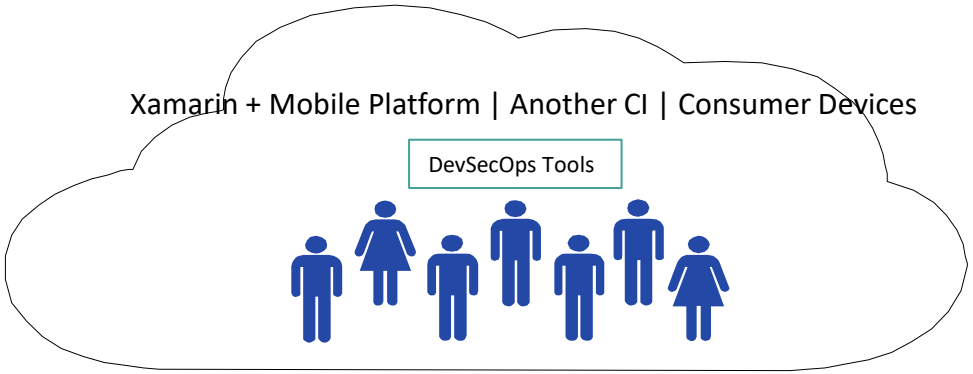
Problem Statement



Development Group A



Development Group B



Development Group C

- Many autonomous development groups (10s -100s), developing apps using several different technology stacks
- Some groups are working on well-established ”legacy” apps, others on next generation applications with modern tools
- Different approaches to detecting and closing security vulnerabilities: with every commit or build or at sprint boundaries or all of the above

Always Designing for People™

Challenge: Lack of Uniform View across Departments

- Lack of a uniform view and understanding of security state of applications
  - Difficult to assess and compare security posture of various products across departments
  - Difficult to enforce a uniform level of compliance with enterprise guidelines

- Cost of maintaining separate departmental infrastructures
  - Headcount/License/Training/Maintenance

Challenge: Managing Diversity of Scanners and Security Information Sources

- Numerous scanners and scanner types available
  - Open Source, Existing Enterprise Licenses for on-prem and SaaS models
  - Lightweight (take a few minutes) vs Exhaustive (may take hours to run)
- Selection of appropriate scanners for comprehensive coverage
  - SAST [Static Code Security] Scanner
  - SCA [Software Composition Analysis] Scanner
  - Embedded Secrets Scanner
  - DAST [Dynamic App Security] Scanner
  - Infrastructure mis-configurations (cloudformation, kube deploy, etc.)
- Ability to process vulnerability feeds from various input sources
- Coping with scanner noisiness/chattiness

Challenge: Developer Enablement

- How to ensure that developers and development teams are tasked only with security vulnerabilities relevant to them?
- Rich set of application artifacts - git branches, repositories, build processes, docker containers, application assemblies, cloud accounts - create difficulties in linkage to devs or dev teams
- Lack of information sharing between development teams
- Actionability of remediation guidance by app developers
  - App developers are not security experts!!
- Process inefficiencies in consultation between development teams and CSO (Security SMEs)

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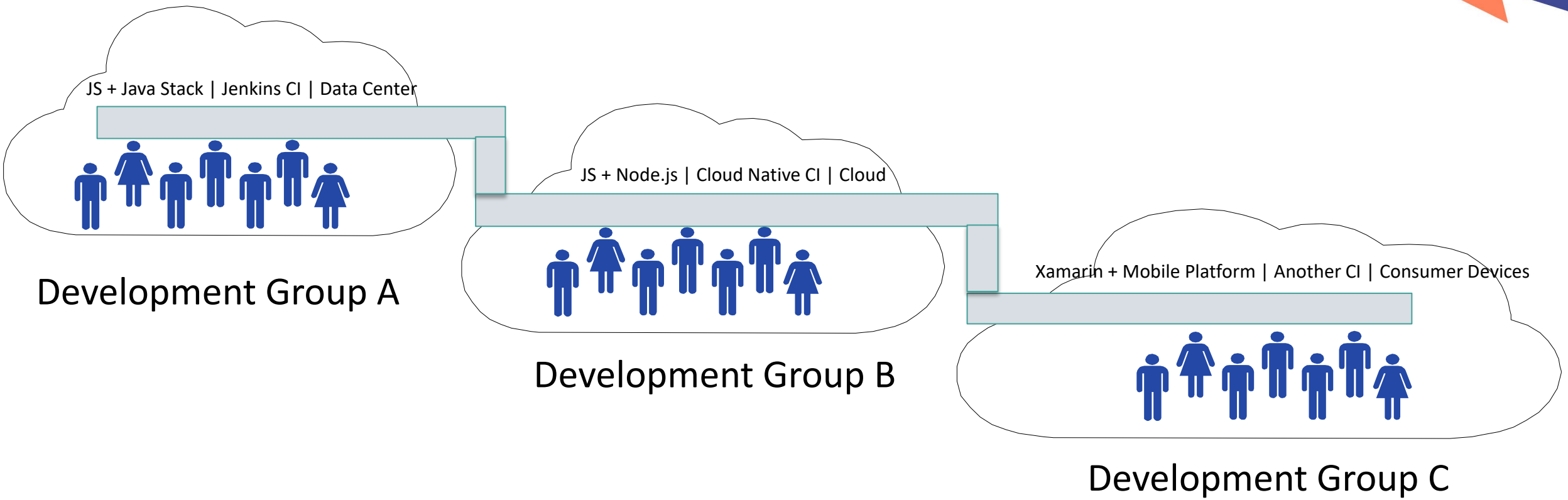
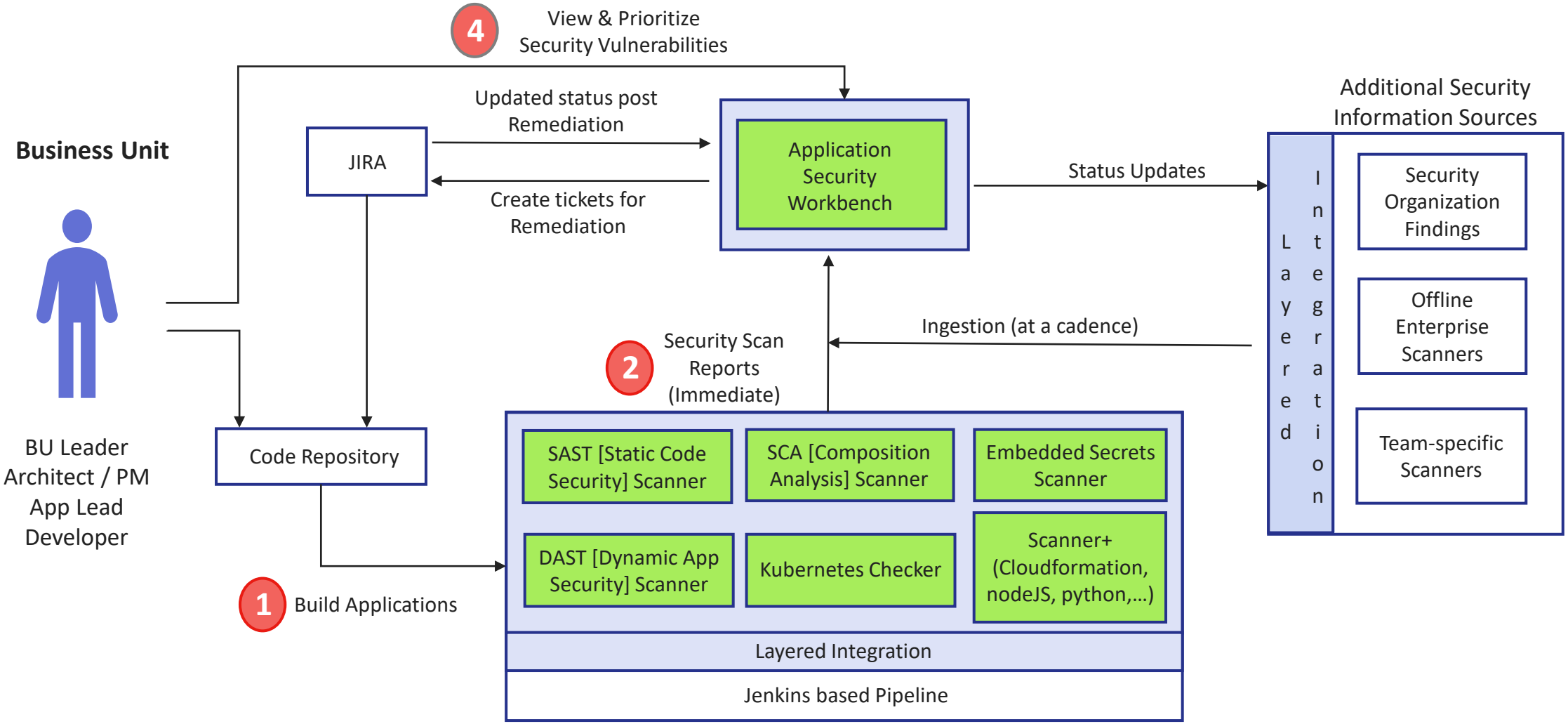
Solution

Solution: Enterprise-scale DevSecOps



- Shared infrastructure “plugs-in” to the specific development tech stacks and CI+CD frameworks used by different groups
- Layered architecture accommodates new tech stacks, languages and target platforms
- Ability to process and manage security vulnerabilities from diverse scanners and security information sources

High Level Logical Architecture



Solution

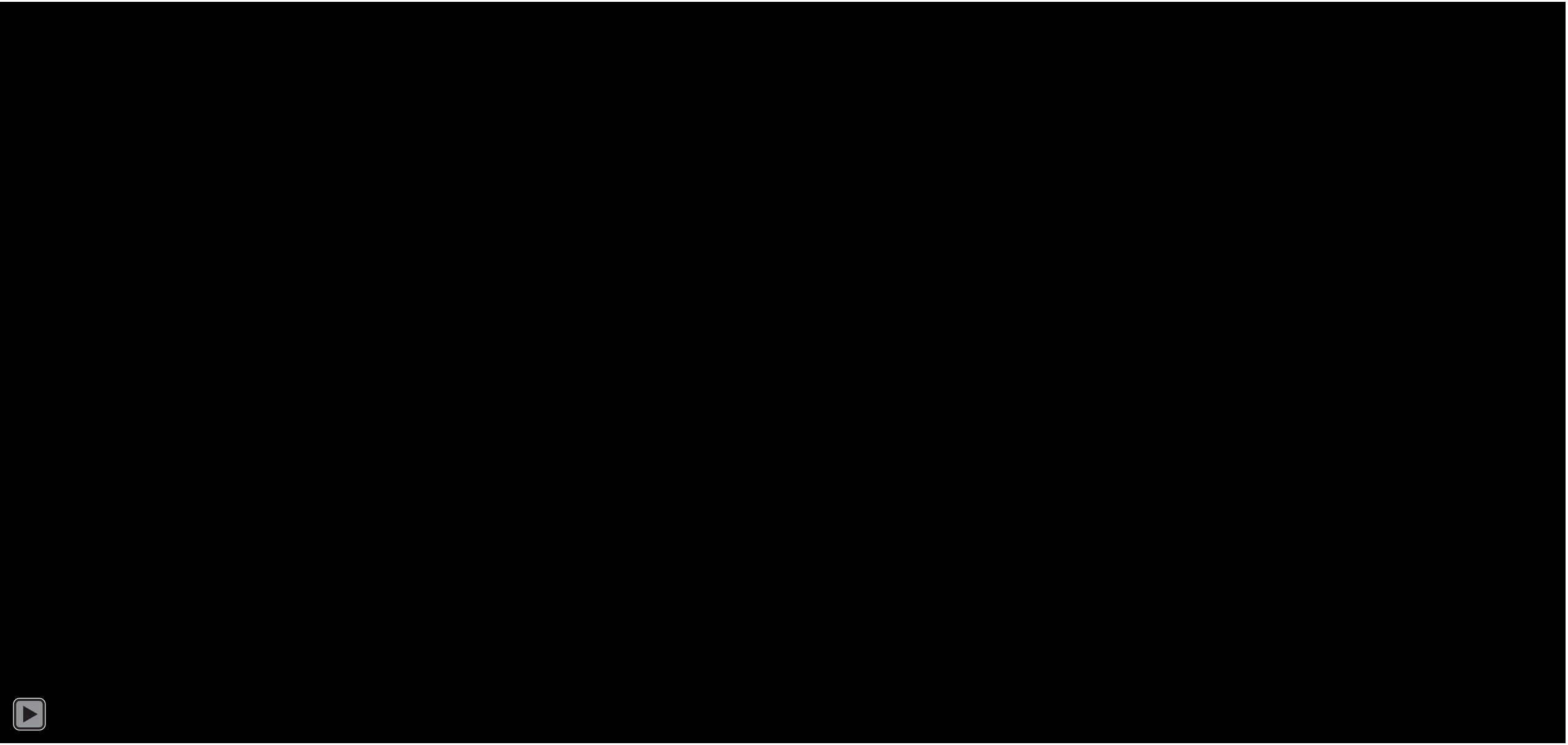
- Software framework built out of stock components and open source
  - Scanner layer provides a uniform way to package scanners into docker images
    - We selected a standard set of open source scanners familiar to us
    - Can be replaced by alternatives or licensed versions as needed
  - Dockerized scanners can be plugged into many different CI pipelines
    - Current focus is on Jenkins-based pipelines, but others are in our backlog

- Linkage between repositories/projects to products and teams
  - Based on machine readable meta-data added by teams to repositories/projects
  - Ensures that code/artifacts/assemblies/docker images/cloud accounts can be linked to products and teams

Solution (contd.)

- Workbench provides a generic data model and uniform GUI for all security vulnerabilities
  - Allows new scanners or security information sources to be added as needed
    - Including off-line scanners and security information sources that are available asynchronously
  - Standardized display of vulnerabilities
    - Severity, Remediation Guidance, False Positives, Acceptable Risk
    - Main focus is helping application developers to act on the information
      - Including ways of sharing information between teams acting on similar vulnerabilities
- Workbench provides division/product level rollups
  - Fine grained vulnerability reports at repositories/artifact level
  - Aggregate vulnerabilities at department/product level
  - Exposes extent of security maturity across division/products

Video Demo



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Learnings

Apply #1 [Immediate]

- Agree on an enterprise-wide approach with all stakeholders (Dev teams, leadership, CSO office)
  - Identify DevSecOps efforts that are on-going in different teams and capture their requirements
- Identify if there are any existing enterprise license agreements with security vendors
  - Supplement with use of well-respected open source systems
  - Security scanners are a commodity, examine vendor claims of superiority with caution!
- Agree on a base level set of security scanners and information sources
  - Getting off the ground is key; don’t try to achieve nirvana!!

Apply #2 [30-60 days]

- Ensure that the selected tools support varied team development methodologies and different tech stacks
  - This is why a pluggable framework is important
  - This will also guide your BUY vs BUILD decision
- Agree on how security vulnerabilities should be surfaced
  - E.g., Webapp, webex, email, CI/CD links, bitbucket annotations
- Identify and engage with early adopters / champions
  - Establish regular feedback mechanism

Apply #3 [180 days]

- Develop a process for remediation timelines and priority
  - Who determines impact and risk and how will it be manifested by your tools?
  - Not every security issue can be fixed easily or quickly, important to have a tracking process
- Culture shift through office hours/trainings
  - Developers to become familiar with security vulnerability patterns common within the enterprise
  - Train developers on becoming proficient at remediating these vulnerabilities

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Conclusions

Closing Thoughts, Credits and Demerits

- Enterprise-scale DevSecOps requires going beyond selecting or creating a toolset
  - Culture change for both Development Teams and Security SMEs
  - Requires process changes in Development Teams and movement away from a model of “security as punishment/shaming”
- Credits
  - OWASP organization and community esp. open source tools
  - Vendors supporting open source tools (SonarQube, Anchore - Grype/Syft)
- Demerits
  - Vendors with unrealistic and unreasonable claims pushing proprietary solutions