Blockchain and DevOps: Securing blockchain applications with DevOps

Tej Aulakh - Managing Consultant
Agenda:

- What is Blockchain?
- Blockchain application development use cases
- Blockchain and DevOps - Key challenges in structural and process barriers for DevOps adoption
- Steps to enhance the integration between Blockchain application security and DevOps
WHAT IS BLOCKCHAIN

- A blockchain is a **distributed ledger** that groups transactions and records them in chunks/blocks of data. The new block is linked chronologically to the previous block using cryptographic signature, thus forming an append-only data store called a ‘blockchain’.

BITCOIN ≠ BLOCKCHAIN
HASH, BLOCK, BLOCKCHAIN

SHA256 Hash

Data: 

Hash: e390c41f25f6f8c1c118a0b7e39f9682d2c27a3e4e45f903c4a8f9391b762b655

Block

Block: # 1

Nonce: 125608

Data: 

Hash: 00007127b5a5d505b0b95e45423f9c11b9652e5ebca4b26d2c27b896aa89a365e5a

Block

Block: # 2

Nonce: 30230

Data: 

Hash: 000015763c4259c032cb17d91b36b206d60f2c28e5f9774f46a5

Blockchain

Block: # 1

Nonce: 15316

Data: 

Prev: 000000000000000000000000000000000000000000000000000000000000000

Hash: 000015763c4259c032cb17d91b36b206d60f2c28e5f9774f46a5

Block: # 2

Nonce: 30230

Data: 

Prev: 000015763c4259c032cb17d91b36b206d60f2c28e5f9774f46a5

Hash: 000015763c4259c032cb17d91b36b206d60f2c28e5f9774f46a5

Block: # 3

Nonce: 12567

Data: 

Prev: 000012567896d9770d09a7e48497a0

Hash: 000012567896d9770d09a7e48497a0

Source: https://anders.com/blockchain/
# Blockchain - Key Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDENTICAL STATE OF DATA</td>
<td>Validated data across all participating nodes in the network is identical</td>
<td>• Reconciliation eliminated</td>
</tr>
<tr>
<td>CONSENSUS</td>
<td>There are a number of different consensus algorithms, including Proof-of-Work, Proof-of-Stake, Tendermint etc</td>
<td>• Higher confidence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Data communicated can be easily verified</td>
</tr>
<tr>
<td>IMMUTABLE LEDGER</td>
<td>Data stored in the blockchain cannot be changed. (You can but would need multiple orders of magnitude computing power, and even then #1 will be in your way)</td>
<td>• System of record</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Oracle for event occurrence</td>
</tr>
<tr>
<td>DECENTRALISED</td>
<td>No central regulator or entity required to validate and approve transactions.</td>
<td>• Reduced cost</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Efficient</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disintermediation of 3rd party</td>
</tr>
</tbody>
</table>
Widespread use…

- Financial Services – Financial transactions and compliance
- Smart Contracts – Automated payments
- Healthcare – Patient Records
- Automotive - Car sharing, mobility services
- Cybersecurity – Decentralized authentication
- Governments – Public Records
- Retail – Trade of goods and services
- Etc.
DevOps for blockchain development...
DevOps Challenges

Cultural

- Lack of Executive team’s support on resources and budget
- Misaligned goals in a collaborative team approach
- Unable to establish champions within the organization
- Time to market pressure
- Lack of staff training on processes and tools
DevOps Challenges

Processes
➢ No central DevOps group
➢ Lack of commitment to integrate security into SDLC
➢ Unclear process framework for different roles
➢ Lack of visibility into shared infrastructure for DEV/QA/OPS teams
➢ Minimal SME knowledge of the application stack and the environment
➢ Lack of knowledge on defining right the metrics to determine efficiency
DevOps Challenges

Tools

➢ Different tools in use with overlapping features
➢ Lack of knowledge in tools for automation
➢ Teams spending excessive time and resource on custom build integrations
➢ Lack of test automation while focusing on CI/CD
Integrating Security into DevOps

Culture

➢ Promote DevOps culture and what it means for security
➢ DevOps movement is built on breaking down the silos in the organization
➢ Allow each team member take responsibility over each project, instead of just their one role.
➢ Accept and support different teams working together to fix broken processes, and rewards innovation
➢ Make developers responsible for their own codes security
➢ Integrate DevOps and security together for a strong application security program
➢ Foster the relationship between development and operations teams on security considerations and how security processes can better fit into the SDLC
Integrating Security into DevOps

Automation

➢ Integrating security into the development lifecycle should be a cornerstone of any application security program

➢ Shifting security to the left and early integration of automated security testing and security bug tracking is a must

➢ Continuous Integration (CI) and Continuous Delivery CD are vital part of DevOps

➢ Automation not only enables faster releases and better productivity but also prevent defects, create consistency, and enable self-service.
Integrating Security into DevOps

Processes

➢ Having a constant grasp on the security standing of a build, project, and the organization as a whole is essential for a true DevSecOps environment.

➢ Make sure security metrics are visible to every group as they are the key to the success of DevOps and Security.

➢ Ensure your tools track individual and overall security vulnerabilities introduced in a build, the time it takes to detect them, and the time it takes to remediate.
Collaboration

- Collaboration between teams is another DevOps essential, and the security team must be a part of the communication stream.
- Finding common ground on the challenges each team faces is a key to success.
- Security team must listen to the pain points of the other teams and help find ways to improve security processes.
- Collective ownership must be accomplished through sharing information, tools and practices.
SecurityLabs Overview

Team of experienced security specialists providing complete range of security services

Managed Vulnerability Scanning & Penetration Testing

- **Network**, Wireless & SCADA
- Web and Mobile **Applications**
- **Source Code Analysis**
- **Software Architecture** Review
- **Devices** (SmartHome, Network Devices, Banking, Automotive)

Network - Systems, Services, Firewall, IDS, IPS etc.
Application - Authentication, Authorization, Input Validation
Device Hardware - Unauthorized Access, Encryption, Data security
Mobile - Client Data Storage, Data Transport, API
Cloud - Backend Server, Authorization, Update security
For more information contact:

securitylabs@spirent.com
tej.aulakh@spirent.com

Local Spirent Contacts:
pattie.kitano@spirent.com
rick.ruta@spirent.com