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New Window of Opportunity:

Certificate Transparency - A Certification Authority's Perspective

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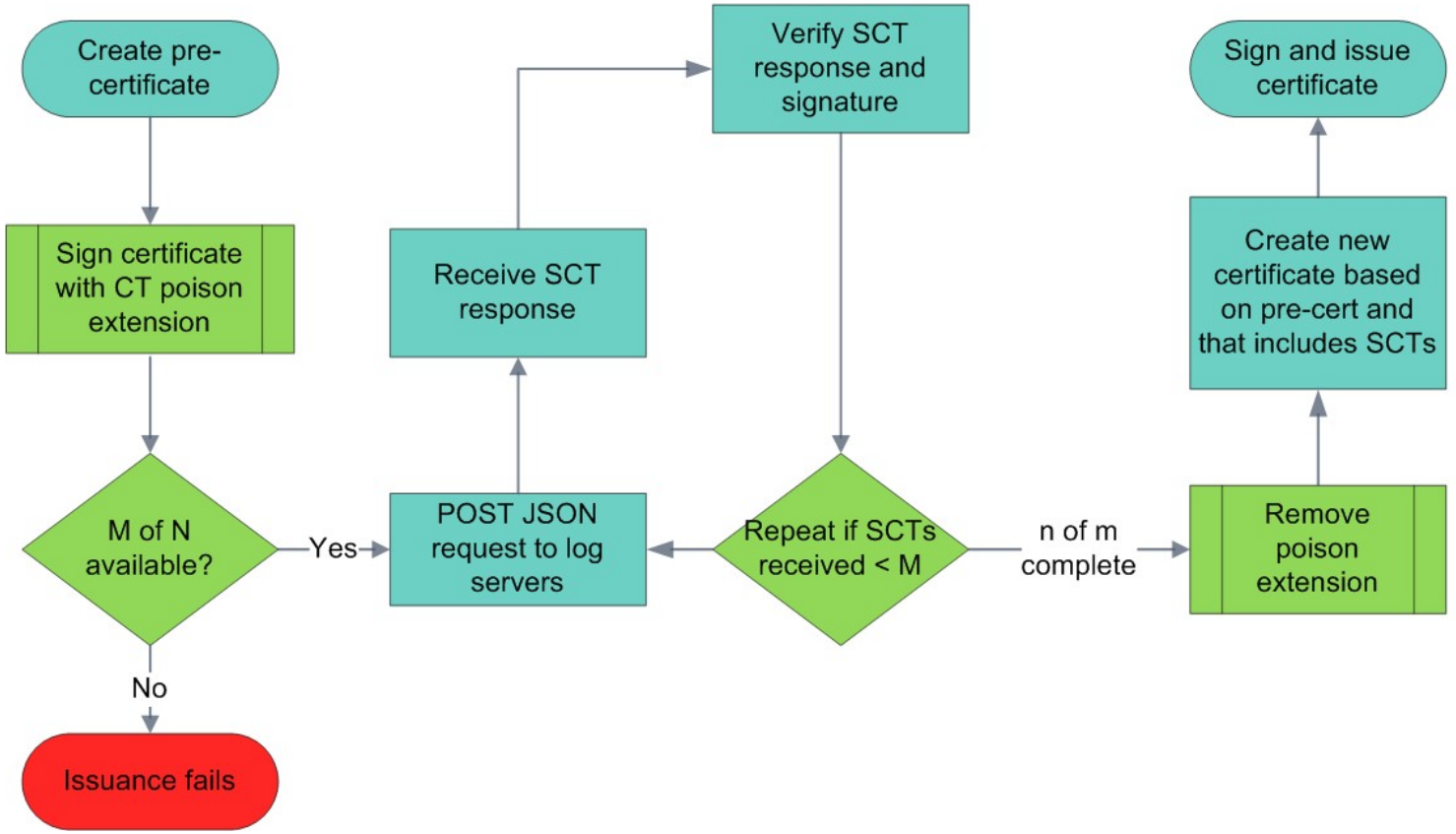
Introduction

- Goals of Certificate Transparency:
  - Provide insight into issued SSL certificates
  - Provide better remediation services
  - Ensure CAs are aware of what they issue
- DigiCert supports the concept of transparent certificate practices and certificate logging:
  - Voiced our support of transparency early on
  - Already accessing Google's log server
- Some outstanding areas require discussion prior to advocating industry-wide implementation

Issuance Flow

1. CA submits pre-certificate
2. Log operator provides proof
3. CA confirms integrity of proof
4. CA issues certificate with proof



Transparency

- Benefits
  - Fast detection = better mitigation
  - Greater visibility = better accountability for domain owners
  - Visible trust in operations = increased trust for CAs
  - Greater opportunity for discussion on certificates = improvement in Internet security
- Security
  - Enables detection of problem and mis-issued certificates
  - Necessary for adequate remediation

Public Logging

- Public logging was discussed previously in CA /B Forum
  - Action by a browser was needed to make it happen
- Public log shines a light on CAs
- Public log provides mitigation
  - All of the incidents could have been more quickly detected and remediated with CT
- Public log helps researchers
- Public log is detection in security
  - Baseline requirements is prevention
  - Revocation is remediation

Security Improvement

- Raises awareness of practices
  - Allows broader observation of a CA's practices
  - Allows domain owners to identify illegitimate use of domain names (Early Warning System)
- Exposes weak points/players in ecosystem
  - Enables research to identify improvement areas
- Enables trust decisions for domain owners
  - Self-regulating mechanism for the market

Other Benefits

- Backward compatible
- Driving towards implementation
- Expands the existing system
  - SSL has a proven track record
  - Lots of institutional knowledge
  - Increasingly stringent standards
- Avoids “unintended consequences” of new technology
- Deployed by CAs and Browsers
  - Web site operator participation is not required

Implementation

- Obtained REST JSON API from Google (URL reference)
- Identified log servers
  - No new infrastructure
- Updated our issuance code to communicate with log server
- Created code to verify signed proof on response before embedding into certificate
- Modified our certificate profile

Remaining Questions from CAs

- Number of Proofs
  - Each proof increases certificate size
  - Increased certificate size hampers performance
- Privacy, competitive business considerations
- Level playing field requirement for all CAs
- Exemptions for internal certificates
- Log accessibility and resiliency of deployment

Log Server Considerations

Model implementation provided by Google

- Uses SQL light for log tree storage
- Which CAs can add to a log?
- What will be considered a trusted log?

Security policy for trusted log operation is needed

- Identify desired uptime and performance objectives
- Scope broad enough to include entire system (e.g. mitigating disruption due to log compromises)
- Perform risk assessment and adopt controls
- Policy adoption process needs to be quick / efficient

Conclusion

DigiCert supports Certificate Transparency because it

- Addresses vulnerabilities in the current trust model
- Creates transparency and accountability that will lead to prevention and early detection of mis-issuances
- Is based on existing technologies that are easily supported with industry coordination
- Enhances existing self-regulating mechanisms by leveraging an existing, refined and time-tested CA trust-anchor system while avoiding the “unintended consequences” of new technology in unfamiliar space