



QUALYS SECURITY CONFERENCE 2018

# Policy Compliance & Security Configuration Assessment

Automate the Assessment of Technical Controls & Mandate-based Security Requirements

# Compliance Challenges

Continuing Expansion of  
Industry & Regulatory  
Mandates

Ensuring Coverage of  
Technical & Non-Technical  
Controls

Maintaining Visibility Across  
Silos

Due Diligence Beyond  
Regulated Environment



# Necessities to Support Digital Transformation:

Complete Visibility across Business Units, Technologies, and Environments

Simplified Processes, So they can focus on improving security rather than running products

Flexibility options for capturing required compliance data

Support for emerging technologies and capabilities

# Necessities to Support Digital Transformation:

Tight integration across security technologies to support complex mandates and audit requirements

Automation and process integration to support DevSecOps

Comprehensive reporting against regulations, mandates & audit objectives

Use Case:

# FedRAMP/NIST Compliance via unified security program

Customer: Cloud-based Infrastructure solution Provider

Digital Transformation underway

FedRAMP certification driving compliance unification

Leveraging NIST for control objectives company wide



Goals:

Address FedRAMP compliance as a bi-product of good cybersecurity practices

Consolidated cybersecurity dashboard based on the NIST objectives



Requires:

Security Vendor Consolidation

Integrated Solutions

Strong Regulatory Content

End-End mandate reporting

Breadth & Depth of Coverage

NIST Control	NIST Control Objective	Qualys Applications
CM	Information System Component Inventory	AI SYN
CM	Inventory of Authorized and Unauthorized Software	AI SYN VM PC
CM	Secure Configuration for Hardware and Software	TP
RA-5	Continuous Vulnerability Assessment & Remediation	VM PC TP CM
AC, IA	Controlled Use of Administrative Privileges	PC
AU	Maintenance, Monitoring and Analysis of Audit Logs	PC FIM
AC	Email and Web Browser Protection	VM PC SAQ
SI-4	Malware Defense	PC IOC WAS WAF FIM
CM, SA	Limitation and Control of Network Ports	VM PC CM WAF
CP	Data Recovery Capability	PC SAQ
CM, RA	Secure Configurations for Network Devices	VM PC

NIST Control	NIST Control Objective	Qualys Applications
AC, SI	Boundary Defense	VM PC CS WAS WAF
AU	Maintenance, Monitoring, and Analysis of Audit Logs	PC FIM
AC, IA	Controlled Access Based on the Need to Know	PC CS
AC-17, AC-18	Wireless Access Control	VM
AC, IA	Account Monitoring and Control	PC SAQ
AT	Security Skills Assessment and Appropriate Training to Fill Gaps	SAQ
RA, CM	Vendor Controls Assessment	IOC CS WAS WAF
IR	Incident Response and Management	PC IOC FIM
CA	Penetration Tests and Red Team Exercises	VM TP IOC

# They started with critical requirements for Quick Wins...

## 1. Inventory Your Systems



## 2. Inventory and Restrict Software



## 3. Secure Configurations



## 4. Continuous Vulnerability Management



## 5. Review Rights & Permissions



## 6. Definition, Automated Evaluation & Review of Processes



# Complete Visibility

Assessment for Out-of-band Configurations

Expanded UDC Support

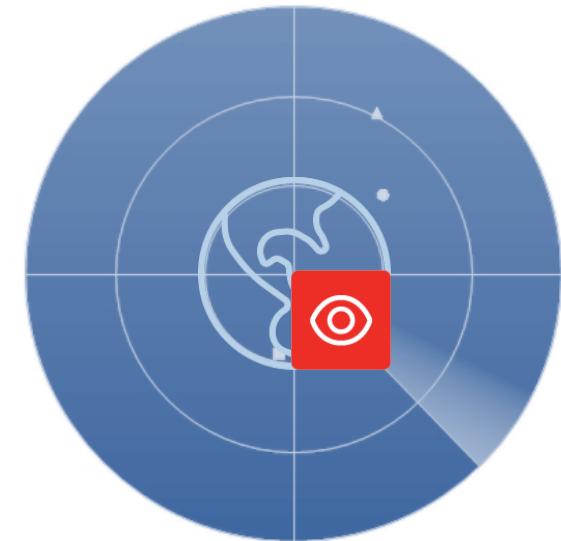
- Agent Support for OS UDC's

- Database UDC

- Windows File Content

- Command UDC

PC Dashboard



# Assess ALL your assets against CIS

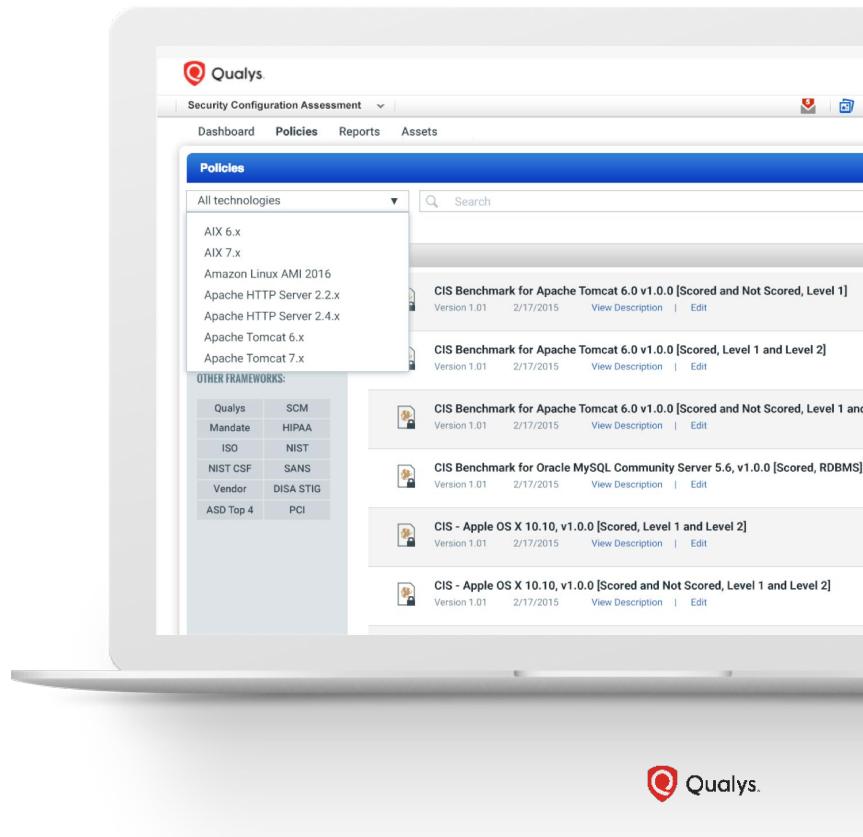
With Qualys Security Configuration Assessment



## Security Configuration Assessment

Lightweight add-on to VM  
Broad platform coverage  
Accurate controls & content  
Simple assessment workflow  
Scan remotely or via agent  
Powered by the Qualys Cloud Platform

*Support for NIST Reporting coming soon!*



# Broad Technology & Control Coverage to support Emerging Technologies & Digital Transformation

Network Devices

Applications

Operating Systems

Emerging Technologies

Containers

Cloud Security

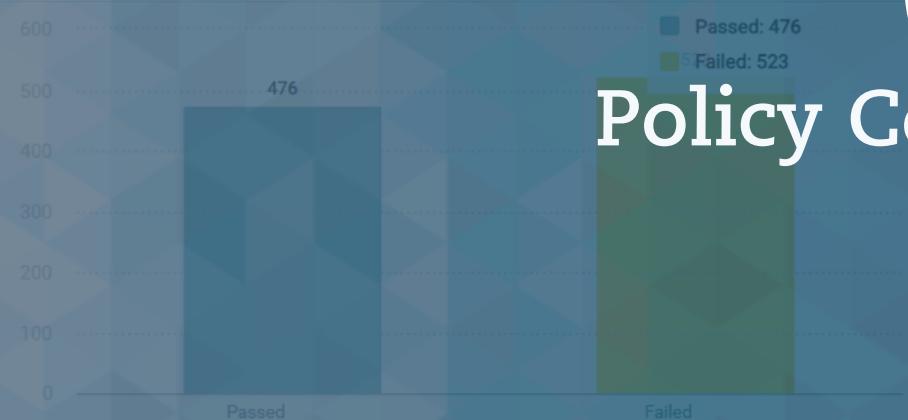
Qualys Platform Security Report  
Security Gap Assessment



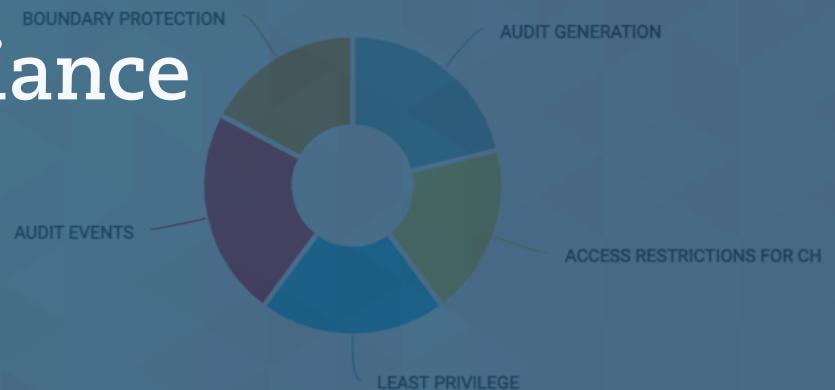
Demo



#### CONTROL STATUS FOR NIST RELATED CONTROLS



#### TOP FAILING NIST CATEGORIES



#### FAILING CONTROL COUNT BY NIST CONTROL ID

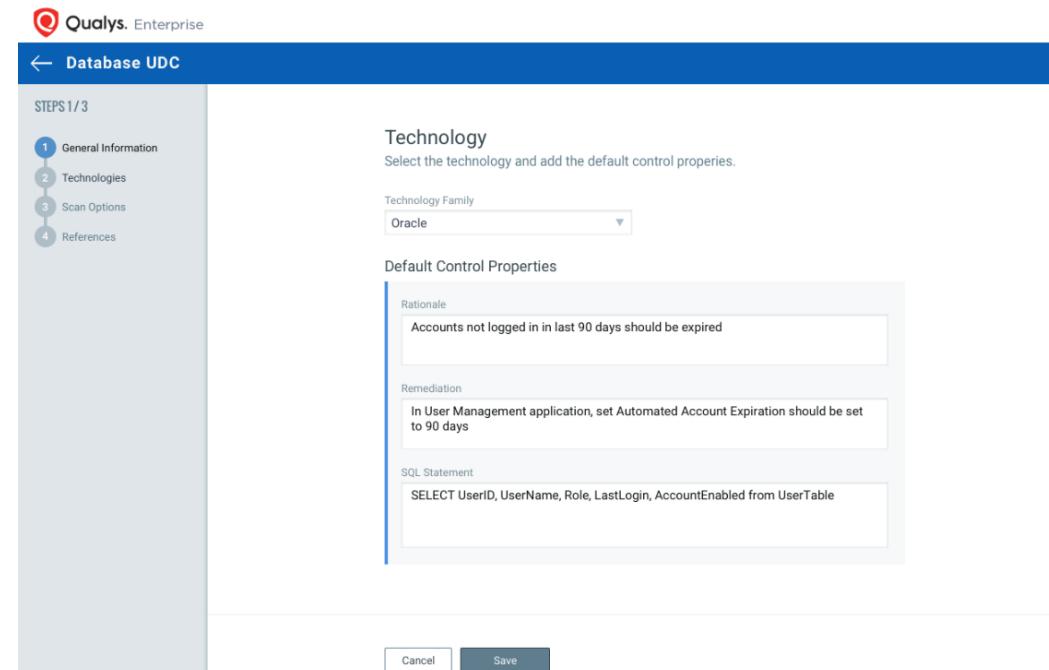


# Database UDC

Initial Support: MSSQL, Oracle, MongoDB

Define DB Query (read only), Customizable by DB Version

Set a query to return tabular data to evaluate (which can include evidence)



Qualys. Enterprise

← Database UDC

STEPS 1 / 3

1 General Information

2 Technologies

3 Scan Options

4 References

Technology

Select the technology and add the default control properties.

Technology Family

Oracle

Default Control Properties

Rationale

Accounts not logged in in last 90 days should be expired

Remediation

In User Management application, set Automated Account Expiration should be set to 90 days

SQL Statement

SELECT UserID, UserName, Role, LastLogin, AccountEnabled from UserTable

Cancel Save

# Then, Configure Pass/Fail Criteria

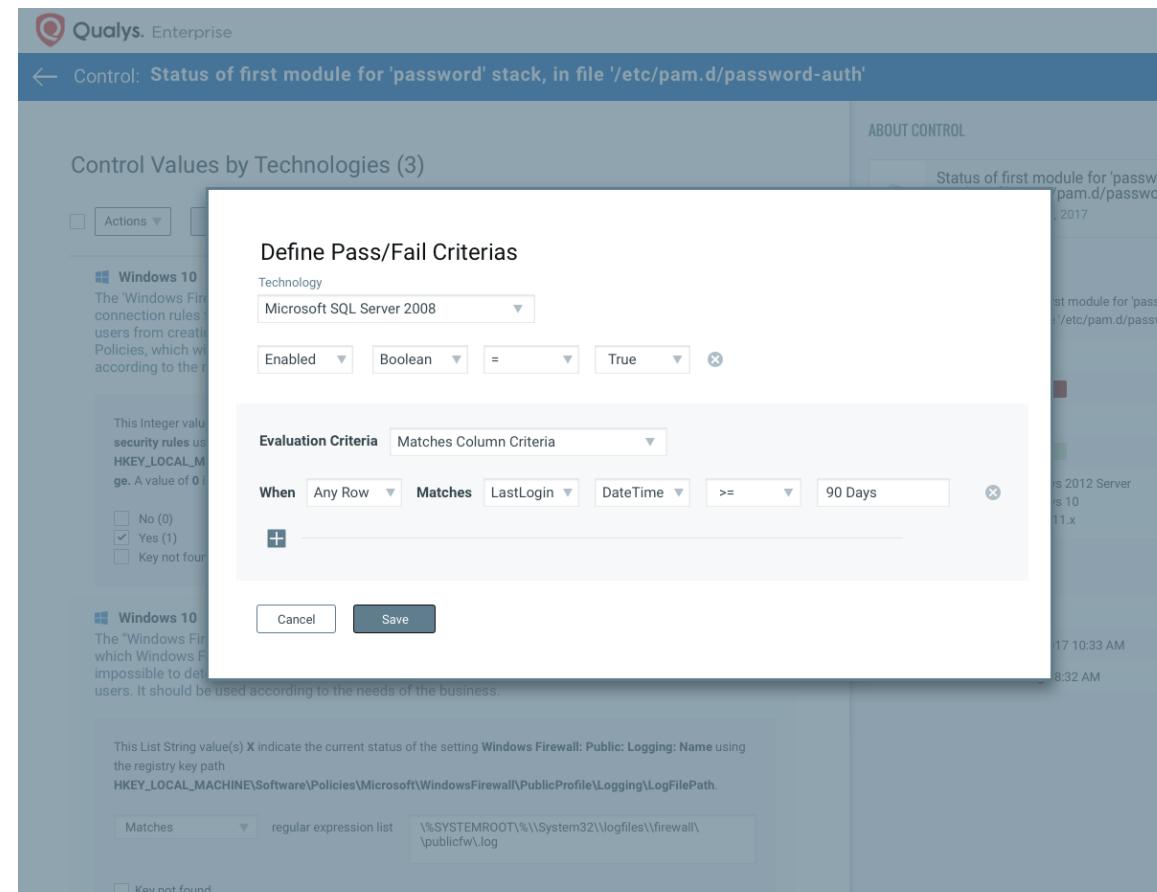
Define a Post-Filter, Then Evaluate based on:

Empty Result Set

Row Count Threshold

Always Pass/Fail (for data gathering)

Match Column Criteria



The screenshot shows the Qualys Enterprise Control interface. The main title bar reads "Control: Status of first module for 'password' stack, in file '/etc/pam.d/password-auth'". Below it, a sub-header says "Control Values by Technologies (3)". A sidebar on the left lists "Windows 10" and "Windows 2012 Server". The main content area is titled "Define Pass/Fail Criteria" and shows a configuration for "Microsoft SQL Server 2008". The configuration includes a dropdown for "Technology" set to "Microsoft SQL Server 2008", and a condition "Enabled" set to "True". The "Evaluation Criteria" is set to "Matches Column Criteria". The "When" condition is "Any Row" with "Matches" set to "LastLogin" and "DateTime" set to ">= 90 Days". A "Save" button is visible at the bottom of the dialog. The background of the main interface shows a list of control values for Windows 10 and Windows 2012 Server.

# Simplifying Processes

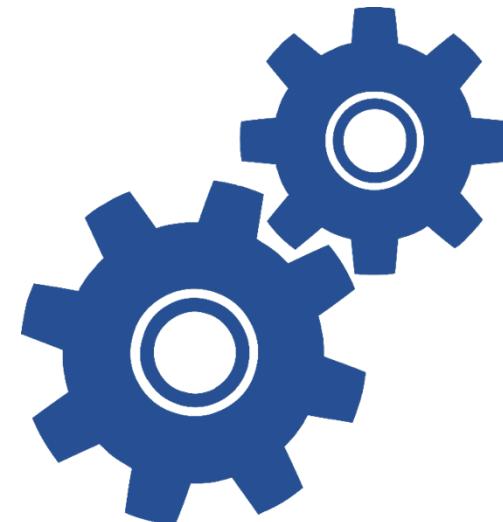
Expanded Library Content

Instance Discovery & Controls

Migration to New UI – Up First:  
PC Dashboard  
Policy & Control Library  
Reporting

Mandate-based Policy Configurator

Leverage Asset Inventory for Asset Lifecycle Management



# Mandate Policy Configurator

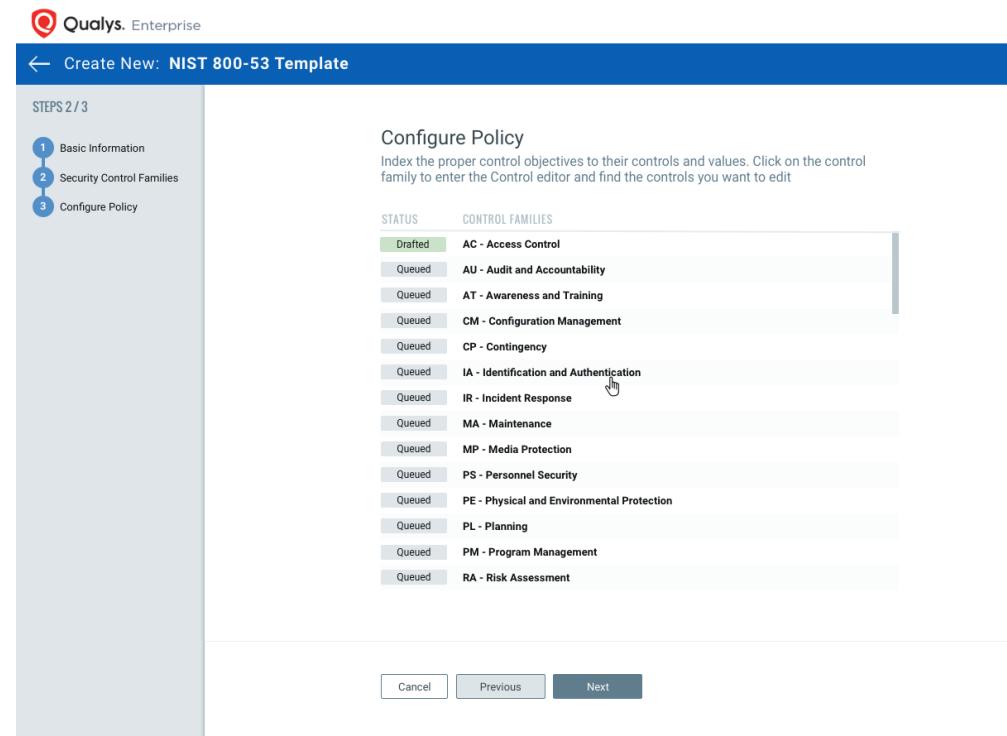
More Granular, Customizable Control Objectives

Custom & Library Mandates

Generate Policies from Mandate

Mandate-specific Reports

Gap Analysis Reports



← Create New: NIST 800-53 Template

STEPS 2 / 3

- 1 Basic Information
- 2 Security Control Families
- 3 Configure Policy

Configure Policy

Index the proper control objectives to their controls and values. Click on the control family to enter the Control editor and find the controls you want to edit

STATUS	CONTROL FAMILIES
Drafted	AC - Access Control
Queued	AU - Audit and Accountability
Queued	AT - Awareness and Training
Queued	CM - Configuration Management
Queued	CP - Contingency
Queued	IA - Identification and Authentication
Queued	IR - Incident Response
Queued	MA - Maintenance
Queued	MP - Media Protection
Queued	PS - Personnel Security
Queued	PE - Physical and Environmental Protection
Queued	PL - Planning
Queued	PM - Program Management
Queued	RA - Risk Assessment

Cancel Previous Next

[!\[\]\(b6e746c7b4144dc38668162e0ee57917\_img.jpg\) Create New: NIST 800-53 Template](#)

STEPS 1 / 3

- 1 Basic Information
- 2 Security Control Families
- 3 Configure Policy

## Basic Information

Name and select the mandate for this template.

TITLE:

MANDATE:

NIST Special Publication 800-53 ▾

Security Controls and Assessment Procedures for Federal Information Systems and Organizations

DESCRIPTION:

[Cancel](#)[Previous](#)[Next](#)

STEPS 2 / 3

- 1 Basic Information
- 2 Security Control Families
- 3 Configure Policy

## Security Control Families

Select all or just the security controls families you want to configure in this template.

CONTROL FAMILIES:

 Select Families  Minimum Security Controls

BUILD LIST OF CONTROL FAMILIES:

 Search... ▾

There are no security control families selected, yet.

Here is where you'll see the control families for this template.

[Cancel](#) | [Previous](#) | [Next](#)

[!\[\]\(b31f8dadb7e3eb059806f092c928caaa\_img.jpg\) Create New: NIST 800-53 Template](#)

STEPS 2 / 3

- 1 Basic Information
- 2 Security Control Families
- 3 Configure Policy

## Security Control Families

Select all or just the security controls families you want to configure in this template.

### CONTROL FAMILIES:

Select Families  Minimum Security Controls

### BUILD LIST OF CONTROL FAMILIES:

▼

Select all (14 families)

AC - Access Control

AU - Audit and Accountability

AT - Awareness and Training

CM - Configuration Management

CP - Contingency

IA - Identification and Authentication

[!\[\]\(cad0ffa75b8eaca640e4a4096d61d6cf\_img.jpg\) Create New: NIST 800-53 Template](#)

STEPS 2 / 3

- 1 Basic Information
- 2 Security Control Families
- 3 Configure Policy

## Security Control Families

Select all or just the security controls families you want to configure in this template.

### CONTROL FAMILIES:

Select Families  Minimum Security Controls

### BUILD LIST OF CONTROL FAMILIES:

#### 10 CONTROL FAMILIES

[Remove all](#)

AC - Access Control 

AU - Audit and Accountability 

AT - Awareness and Training 

CM - Configuration Management 

CP - Contingency 

IA - Identification and Authentication 

[!\[\]\(1988e461b333e846911edb94d59c7a29\_img.jpg\) Create New: NIST 800-53 Template](#)

STEPS 2 / 3

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Queued	<b>IR - Incident Response</b> 
Queued	<b>MA - Maintenance</b>
Queued	<b>MP - Media Protection</b>
Queued	<b>PS - Personnel Security</b>
Queued	<b>PE - Physical and Environmental Protection</b>
Queued	<b>PL - Planning</b>
Queued	<b>PM - Program Management</b>
Queued	<b>RA - Risk Assessment</b>

## Objective: IA - Identification and Authentication

[Cancel](#)
[Done](#)
[Search Options ▾](#)

# 11

Total Control Objectives

### MINIMUM SECURITY CONTROLS

High	3.01K
Moderate	982
Low	89

### PRIORITY

P0 - Priority Level 0	3.01K
P1 - Priority Level 1	982
P2 - Priority Level 2	89
P3 - Priority Level 3	89

### TECHNOLOGY

Windows 2012 Server	25
Windows Server 2012 R2	16
Debian GNU/Linux 9.x	5
Docker 1.x	23
F5 BIG-IP 11.x	15
10 more	

<input type="checkbox"/> Actions ▾	NAME	PRIORITY	SECTIONS	CONTROLS
<input type="checkbox"/>	<b>IA-5 Authenticator Management</b>	P1	15	384
	The organization manages information system authenticators by:			
	a. Verifying, as part of the initial authenticator distribution, the identity of the individual, group, role, or device receiving the authenticator;			
<input type="checkbox"/>	IA-5(1) Authenticator Management   Password-Based Authentication	6	242	
	IA-5(2) Authenticator Management   PKI-Based Authentication	4	48	
	IA-5(3) Authenticator Management   In-Person or Trusted Third-Party Registration	1		
	IA-5(4) Authenticator Management   Automated Support for Password Strength Determination	31		
	IA-5(5) Authenticator Management   Change Authenticators Prior to Delivery	1		
	IA-5(6) Authenticator Management   Protection of Authenticators	8		
	IA-5(7) Authenticator Management   No Embedded Unencrypted Static Authenticators	4		
	IA-5(8) Authenticator Management   Multiple Information System Accounts	0		

## Objective: IA - Identification and Authentication

[Cancel](#)
[Done](#)
[Search Options ▾](#)

# 11

Total Control Objectives

### MINIMUM SECURITY CONTROLS

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10 more	

Search...

Actions ▾

NAME

PRIORITY

SECTIONS

CONTROLS

### IA-5 Authenticator Management

P1

15

384



The organization manages information system authenticators by:

- a. Verifying, as part of the initial authenticator distribution, the identity of the individual, group, role, or device receiving the authenticator; ...

#### IA-5(1) Authenticator Management | Password-Based Authentication

6

242

The information system, for password-based authentication:

IA-5 (1)(a)

Enforces minimum password complexity of [Assignment: organization-defined requirements for case sensitivity, number of characters, mix of upper-case letters, lower-case letters, numbers, and special characters, including minimum requirements for each type];

#### IA-5 (1)(b)

11

Enforces at least the following number of changed characters when new passwords are created: [Assignment: organization-defined number]

#### IA-5 (1)(c)

27

Stores and transmits only cryptographically-protected passwords;

#### IA-5 (1)(d)

63

Enforces password minimum and maximum lifetime restrictions of [Assignment: organization-defined numbers for lifetime minimum

[← Controls: NIST 800-53 for Windows](#)
[Search Options ▾](#)
**36**

Controls

		Actions ▾	Search...	⟳	⬇	⚙	
	CID	STATEMENT / TECHNOLOGIES	TYPE	CATEGORY	BASELINE		
<b>IMPACT BASELINE</b>	<b>3376</b>	<b>Status of the 'Maximum Password Age' setting (expiration)</b> Windows 2012 Server, Windows Server 2012 R2, Solaris 11.x		IA-5 (1)(a)	<b>HIGH</b>		
HIGH	3.01K						
MODERATE	982						
LOW	89						
<b>TYPE</b>	<b>10734</b>	<b>Status of the 'number of days before a [Prompt user] password expiration warning prompt is displayed at login' for 'users with a password' setting</b> Ubuntu 11.x, Windows 2000 Active Directory, Docker 1.x		IA-5 (1)(a)	<b>MODERATE</b>		
ANSSI	3.01K						
Qualys	982						
CIS	89						
DISA	89						
<b>TECHNOLOGY</b>	<b>10965</b>	<b>Status of first module for 'password' stack, in file '/etc/pam.d/password-auth'</b> Windows 2012 Server, Windows Server 2012 R2, Solaris 11.x		IA-5 (1)(a)	<b>HIGH</b>		
Windows 2012 Server	25						
Windows Server 2012 R2	16						
Debian GNU/Linux 9.x	5						
Docker 1.x	23						
F5 BIG-IP 11.x	15						
10 more							
<b>11468</b>	<b>Status of the 'try_first_pass' setting for pam_cracklib.so module in PAM configuration file '/etc/pam.d/common-password'</b> Docker 1.x, Windows 2012 Server		IA-5 (1)(a)	<b>HIGH</b>			
<b>11524</b>	<b>Status of 'fail_interval' setting in the file '/etc/pam.d/password-auth'</b> Windows 2012 Server		IA-5 (1)(a)	<b>HIGH</b>			
<b>10911</b>	<b>Status of 'turn off certificate revocation list (CRL) checking at the Key Distribution</b> Windows 2012 Server, Windows Server 2012 R2		IA-5 (1)(a)	<b>HIGH</b>			

## Control Values by Technologies (3)

 Actions ▾Technology: All  ▾

### Windows 10

The 'Windows Firewall: Apply local connection security rules (Domain)' setting enables domain-based connection rules that govern IPSec connections. As this setting enables or restricts local administrative users from creating such local connection rules, in addition to the connection security rules in Group Policies, which will increase the exposure of the system to remote attacks, this should be configured according to the needs of the business.

This Integer value **X** indicates the current status of the setting **Windows Firewall: Domain: Apply local connection security rules** using the registry key path **HKEY\_LOCAL\_MACHINE\Software\Policies\Microsoft\WindowsFirewall\DomainProfile\AllowLocalIPsecPolicyMerge**. A value of **0** indicates the setting is set to **No**, A value of **1** indicates the setting is set to **Yes**.

- No (0)
- Yes (1)
- Key not found

### Windows 10

The "Windows Firewall: Public: Logging: Name" setting is used to specify the path and name of the file in which Windows Firewall will write its log information. If events are not recorded it may be difficult or impossible to determine the root cause of system problems or the unauthorized activities of malicious users. It should be used according to the needs of the business.

### ABOUT CONTROL



Status of first module for 'password' stack, in file '/etc/pam.d/password-auth'  
Last modified: Apr 12, 2017

### Identification

Statement: Status of first module for 'password' stack, in file '/etc/pam.d/password-auth'

CID: 10965

Baseline: HIGH

Reference: 17.15.2.1

Status: Active

Technologies:  Windows 2012 Server  
 Windows 10  
 Solaris 11.x

### Activity

Last User Login: .\KCTech

Created on: March 1, 2017 10:33 AM

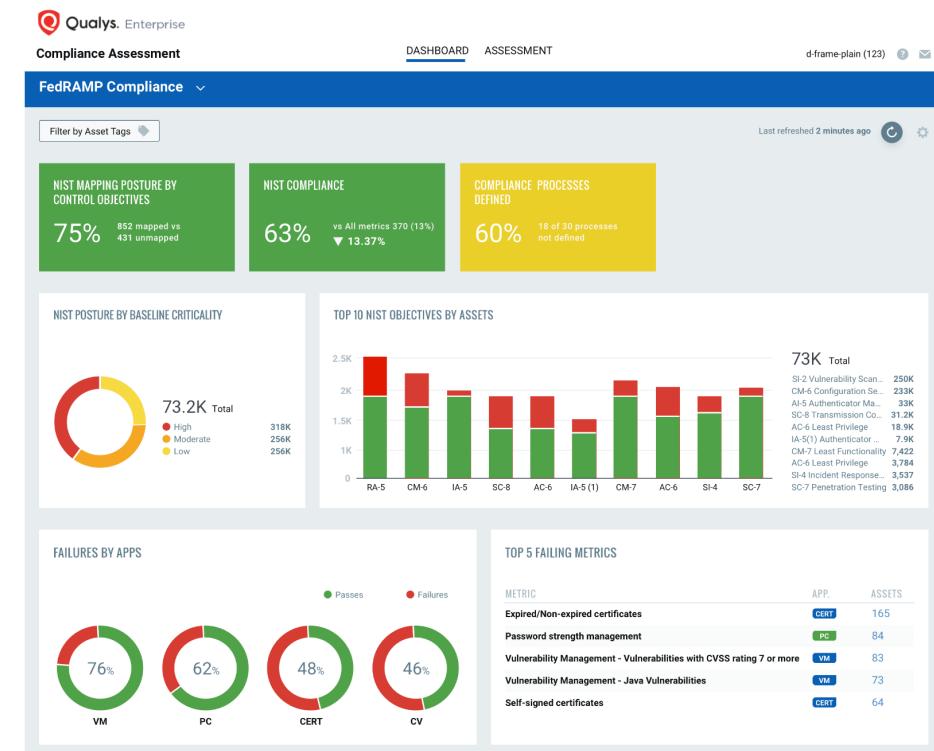
Last Modified on: 8 Mins ago 8:32 AM

# Integration Across the Platform: Unified Compliance Assessment

Out of the box Library of Metrics  
SAQ Self-Assessments  
Vendor Risk Violations  
VM & PC Remediation SLA Failures

Customizable! Map back to Control  
Objectives & Custom Mandates

Result: Single Pane of Glass for  
Reporting Metrics & Compliance  
Violation Tracking across the platform!



# Defining Metrics & Mappings

Leverages new Alerting feature as exposed in apps

Define ANY QQL Query

Action is Log a Compliance Metric

Metrics are then mapped to Control Objectives, which are cross-mapped to regulations

```
vulnerabilities.vulnerability.severity:"5" and vulnerabilities.vulnerability.patchAvailable:"true" and vulnerabilities.firstFound > now-90d
```

The screenshot shows the 'Create New: Rule' interface in Qualys. It includes sections for 'Rule Details' (with a note about user information), 'Rule Information' (with a note about user information), 'Action Name' (input field), 'Description' (input field with 'OPTIONAL' label), 'Alert Query' (input field with 'Begin typing your query' placeholder, 'Sample Queries' link, and 'Test Query' button), and 'Trigger Criteria' (input field).

# Security Metric Examples

High Severity Vulnerabilities/  
Patching

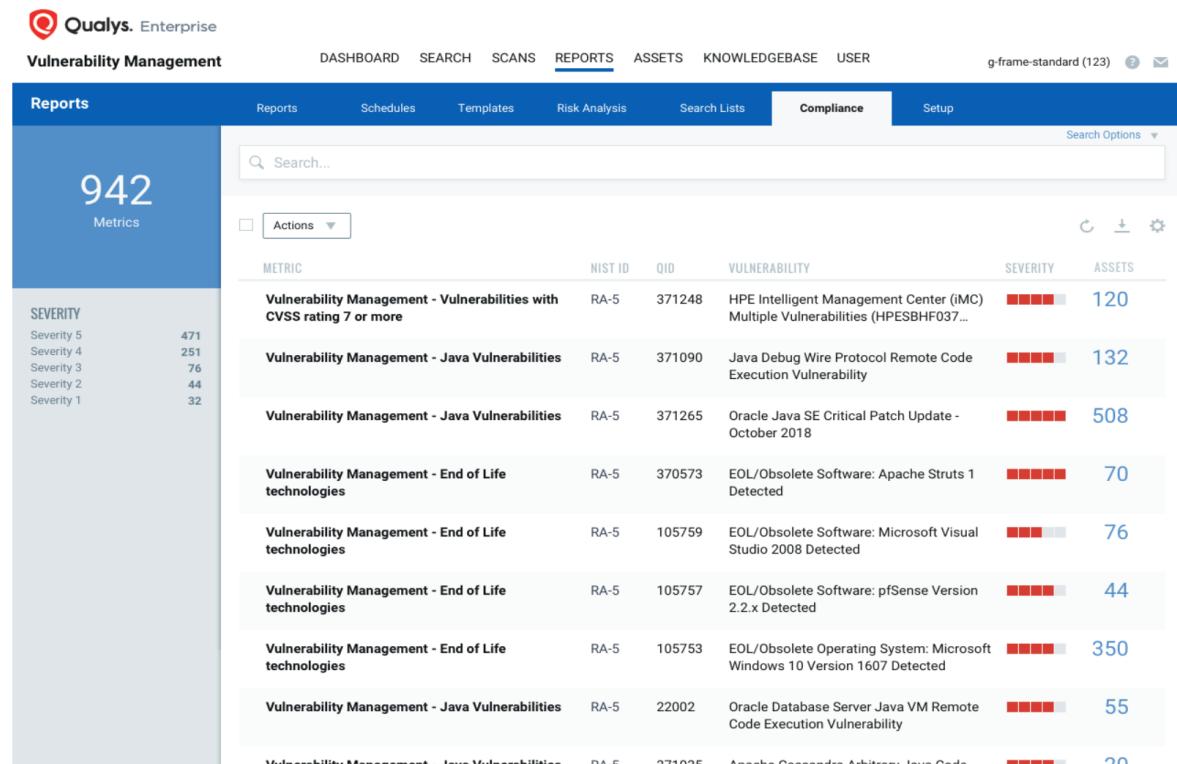
FIM Incident Review Expired

Cloud Security Configuration  
Issues

Expired or Self-Signed  
Certificates

Vendor Risk – Failure to Respond

Procedural Control Gap  
Identified



The screenshot shows the Qualys Enterprise Vulnerability Management interface. The main dashboard displays a total of 942 metrics, with a breakdown by severity: Severity 5 (471), Severity 4 (251), Severity 3 (76), Severity 2 (44), and Severity 1 (32). The interface includes a search bar, an 'Actions' dropdown, and a table of vulnerabilities. The table columns are: Metric, NIST ID, QID, Vulnerability, Severity, and Assets. The table lists various vulnerabilities, including HPE Intelligent Management Center (iMC) Multiple Vulnerabilities, Java Debug Wire Protocol Remote Code Execution Vulnerability, Oracle Java SE Critical Patch Update - October 2018, and multiple entries for EOL/Obsolete Software: Apache Struts 1, Microsoft Visual Studio 2008, pfSense Version 2.2.x, and Microsoft Windows 10 Version 1607.

Metric	NIST ID	QID	Vulnerability	Severity	Assets
Vulnerability Management - Vulnerabilities with CVSS rating 7 or more	RA-5	371248	HPE Intelligent Management Center (iMC) Multiple Vulnerabilities (HPESBHF037...)	<div style="width: 80%; background-color: red;"></div>	120
Vulnerability Management - Java Vulnerabilities	RA-5	371090	Java Debug Wire Protocol Remote Code Execution Vulnerability	<div style="width: 80%; background-color: red;"></div>	132
Vulnerability Management - Java Vulnerabilities	RA-5	371265	Oracle Java SE Critical Patch Update - October 2018	<div style="width: 100%; background-color: red;"></div>	508
Vulnerability Management - End of Life technologies	RA-5	370573	EOL/Obsolete Software: Apache Struts 1 Detected	<div style="width: 100%; background-color: red;"></div>	70
Vulnerability Management - End of Life technologies	RA-5	105759	EOL/Obsolete Software: Microsoft Visual Studio 2008 Detected	<div style="width: 80%; background-color: red;"></div>	76
Vulnerability Management - End of Life technologies	RA-5	105757	EOL/Obsolete Software: pfSense Version 2.2.x Detected	<div style="width: 80%; background-color: red;"></div>	44
Vulnerability Management - End of Life technologies	RA-5	105753	EOL/Obsolete Operating System: Microsoft Windows 10 Version 1607 Detected	<div style="width: 80%; background-color: red;"></div>	350
Vulnerability Management - Java Vulnerabilities	RA-5	22002	Oracle Database Server Java VM Remote Code Execution Vulnerability	<div style="width: 80%; background-color: red;"></div>	55
Vulnerability Management - Java Vulnerabilities	RA-5	371035	Apache Cassandra Arbitrary Java Code	<div style="width: 80%; background-color: red;"></div>	20

Qualys. Enterprise

Vulnerability Management

DASHBOARD SEARCH SCANS REPORTS ASSETS KNOWLEDGEBASE USER

g-frame-standard (123)

Reports Schedules Templates Risk Analysis Search Lists Compliance Setup

Search Options

942 Metrics

SEVERITY

Severity 5	471
Severity 4	251
Severity 3	76
Severity 2	44
Severity 1	32

Demo

PC

# Policy Compliance

METRIC	RISK ID	VULNERABILITY	SEVERITY	ASSETS
Vulnerability Management - CVSS rating 7 or more	RA-5 371078	HPE Intelligent Management Center (iMC) Vulnerabilities (HPESBHF037...	██████	120
Vulnerability Management - Java Vulnerabilities	RA-5 371090	Java Debug Wire Protocol Remote Code Execution Vulnerability	██████	132
Vulnerability Management - Java Vulnerabilities	RA-5 371265	Oracle Java SE Critical Patch Update - October 2018	██████	508
Vulnerability Management - End of Life technologies	RA-5 370573	EOL/Obsolete Software: Apache Struts 1 Detected	██████	70
Vulnerability Management - End of Life technologies	RA-5 105759	EOL/Obsolete Software: Microsoft Visual Studio 2008 Detected	██████	76
Vulnerability Management - End of Life technologies	RA-5 105757	EOL/Obsolete Software: pfSense Version 2.2.x Detected	██████	44
Vulnerability Management - End of Life technologies	RA-5 105753	EOL/Obsolete Operating System: Microsoft Windows 10 Version 1607 Detected	██████	350



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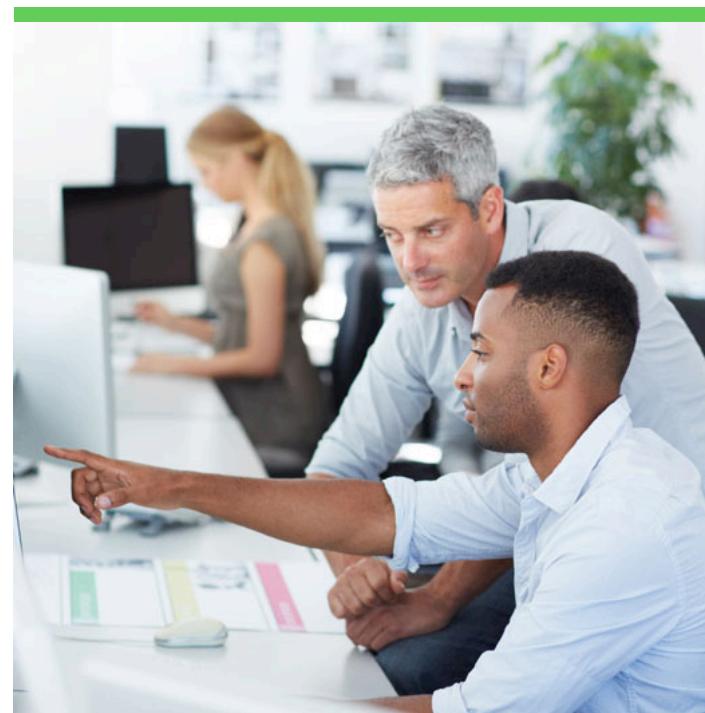
# File Integrity Monitoring

Log and track file changes across global IT systems.

# Validating Integrity

Why do organizations need File Integrity Monitoring solutions?

- Change control enforcement
- Compliance & audit requirements
- Explicit mandates like PCI
- Security best practices
- Compromise detection



## Use Case:

# File Integrity Monitoring for PCI

### Customer: Retail

Distributed network environment that benefits from cloud-based model  
20k+ Windows systems  
Large Linux back end infrastructure on-prem and in the cloud

### Goals:

Monitor for change control enforcement  
PCI auditor requirements

### Requires:

Scalable, cloud-based solution  
Hands-off management of distributed agents  
VM+PC+FIM at the Point of Sale  
Broad Linux platform support

# What Are Customers Monitoring?

Critical Operating System Binaries

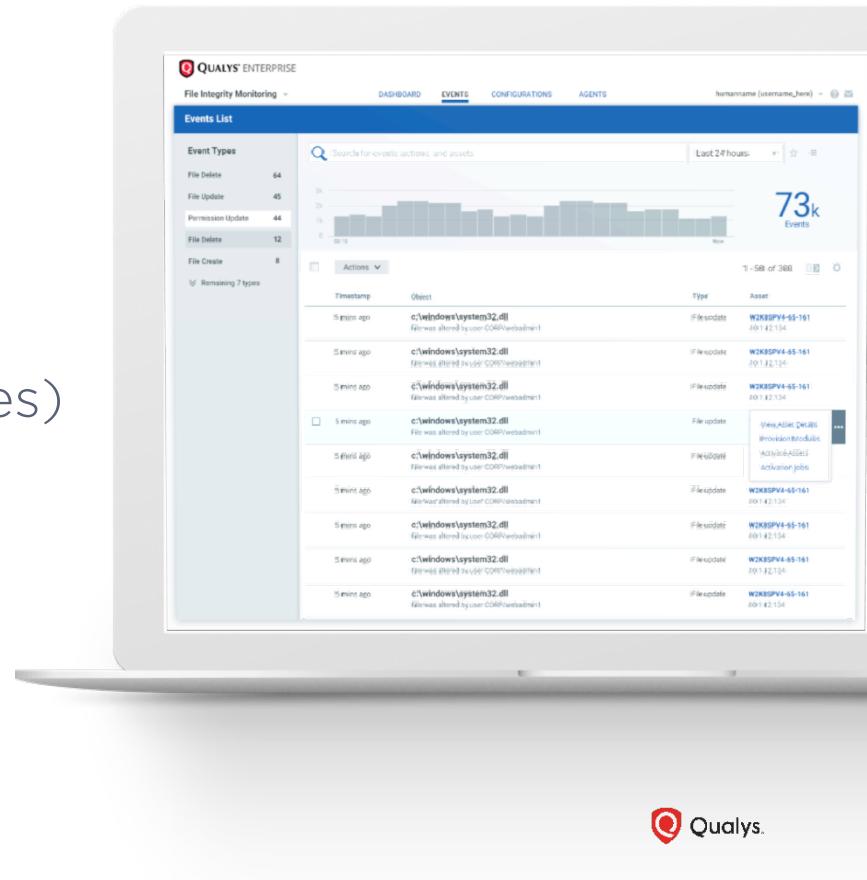
OS and Application Configuration Files

Content, such as Web source

Permissions (such as on Database Stores)

Security Data (Logs, Folder Audit Settings)

User & Authentication Configurations



# FIM Challenges

Deciding what depth to monitor

Tuning out noise, but not missing important events

Scalability of legacy solutions

Meeting auditor event review requirements

# Improvements since GA

Event Review & Incident Management Workflow

Library Content Improvements

AuditD Compatible Windows Agent (2.1.x)

Windows Feature Expansion & Updated Driver (2.1.x)

Several back-end releases for operational improvements & feature support

# Focus for 2019

Simplest tuning in the industry!

Secondary Event Filtering and Automated Correlation

API access to data

Rule-based Alerting

Reporting

Expanded data collection & whitelisting features

Expanded Platform Support

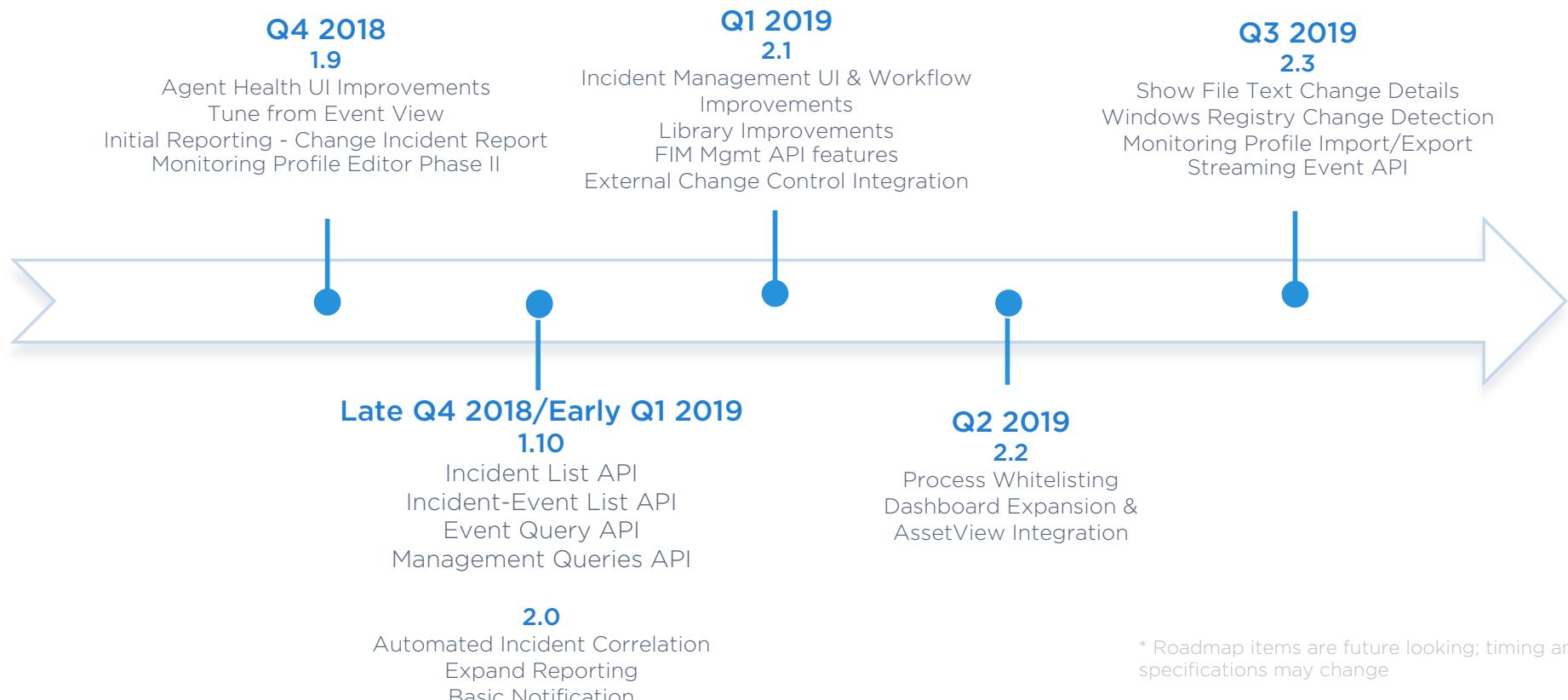


Demo



# Policy Compliance

# FIM Feature Roadmap





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# Thank You

**Tim White**  
twhite@qualys.com