NASTEL

Driving Business Transaction Performance ®

Using Machine Learning and Analytics to Understand How MQ Impacts Your Business

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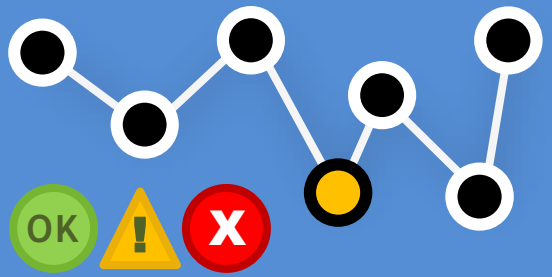
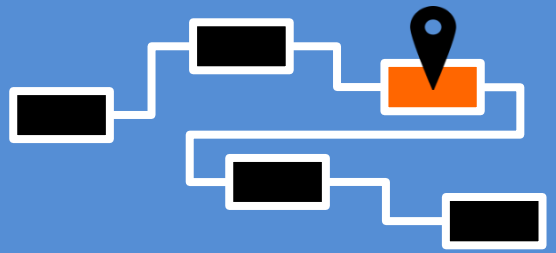
Nastel Technologies – What We Do

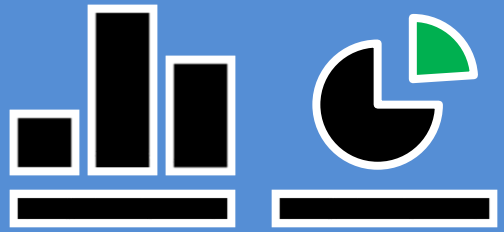
Monitoring



Tracking



Analytics



BUSINESS APPLICATIONS

- Banking Finance
- Transport Logistics
- Claims Processing
- Order Handling
- Payments Processing

The Nastel Difference: Making the Complex Simple

1

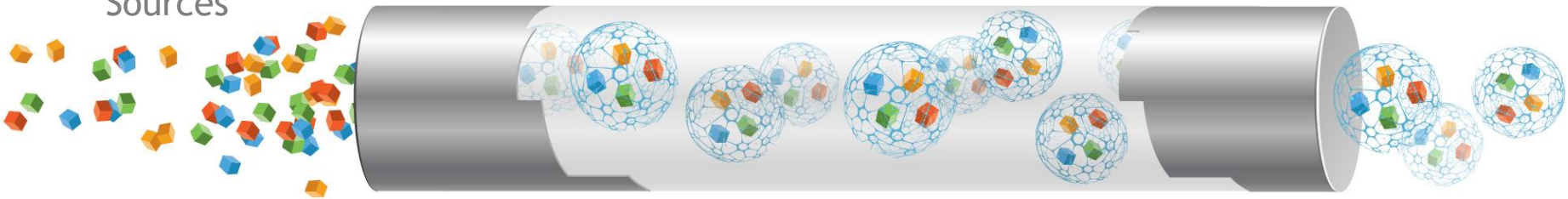
Logs, Metrics & Transactions From Multiple Sources

2

Event/Transaction Synthesis with Alerts and Notifications

3

Intuitive, Actionable Business Insights



Chaotic Complexity
Low-value Data

Data Enrichment &
Business Milestones

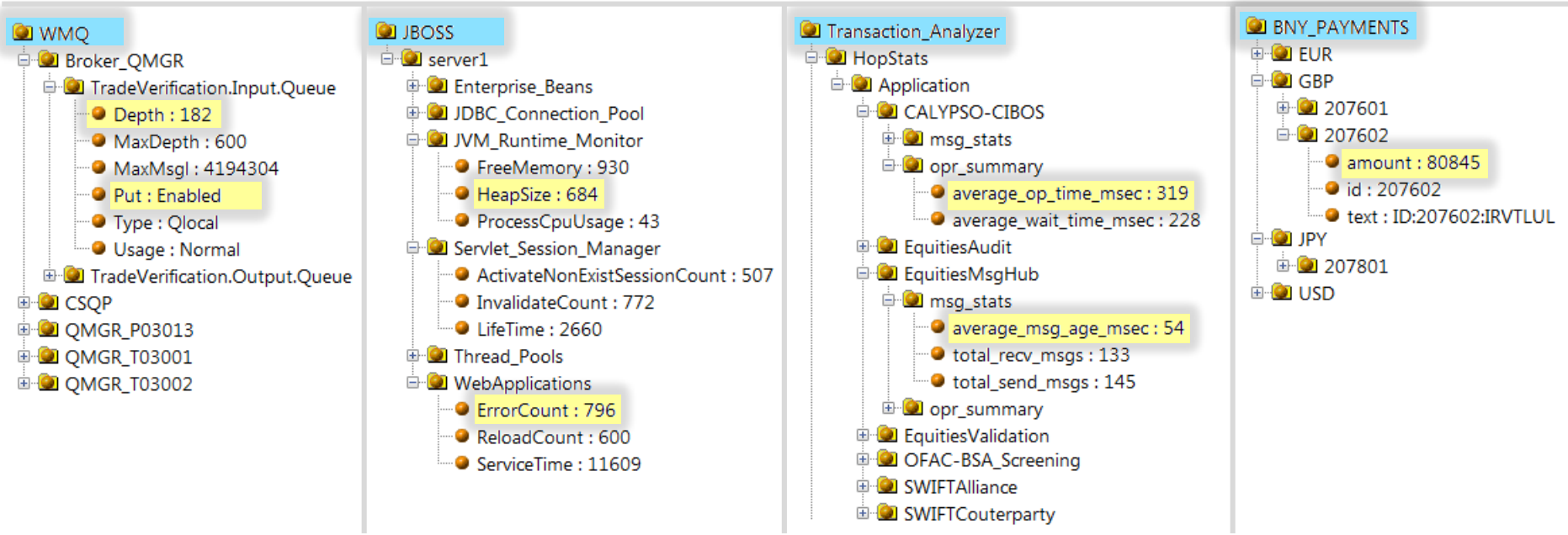
Simplicity
High-value Data

Metrics and Events from Multiple Sources

Application Infrastructure Metrics & Events (Messaging Middleware, ESB, Java, …)

Transaction Metrics & Events

Application Metrics & Events



Nastel's AutoPilot®

Automatic Transaction Tracking & Auditing

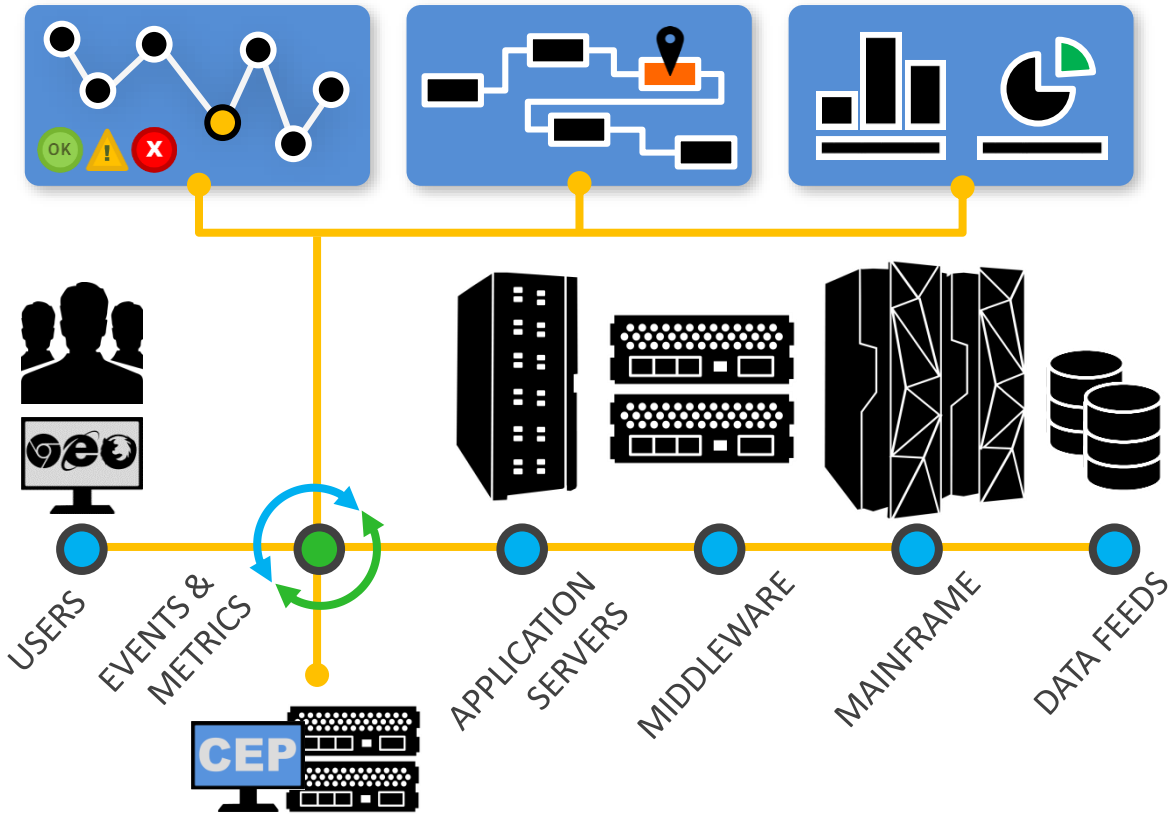
Complex Event Processing (CEP: Situational Awareness)

Unified Application Analytics and Log Analytics

End-User Monitoring, Performance Analytics

Middleware Management and Monitoring

Built on a Big-Data Platform for Extreme Scalability

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Driving Business Transaction Performance ®
AutoPilot® for IBM MQ
Overview:
- Management
- Monitoring
- Message Tracking
- Log Analytics
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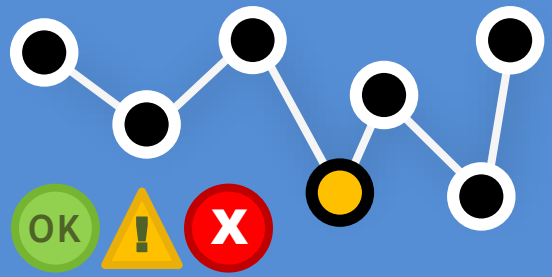
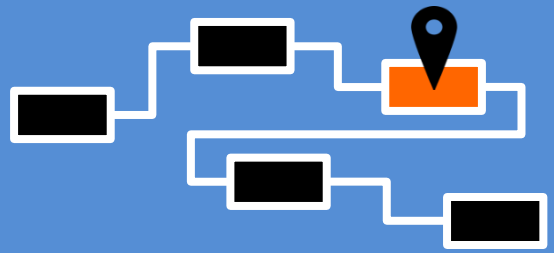
Nastel's AutoPilot® for IBM MQ

Management

Monitoring



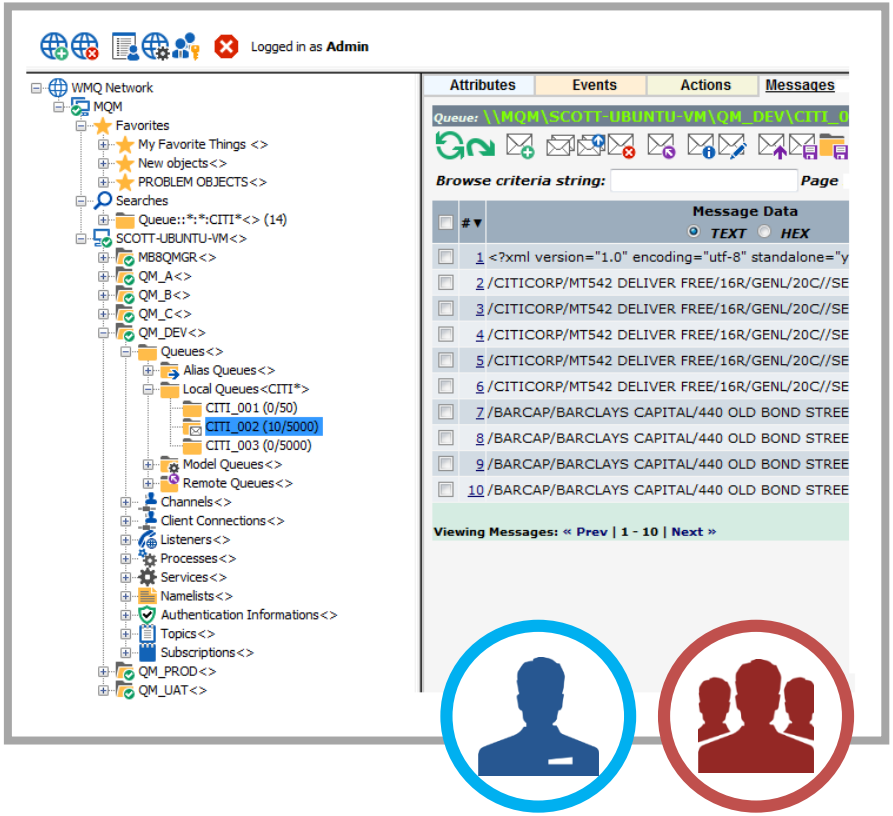
Message Tracking



AutoPilot® for IBM MQ

AutoPilot - Management of IBM MQ

- Auto discovery of WMQ objects
- Automatic Configuration Management
- Audit trail & Rollback of changes to WMQ objects
- Agent and Agent-less management
- Message Management & Search
- Secure, Self Service WMQ Management



AutoPilot - Monitoring of IBM MQ

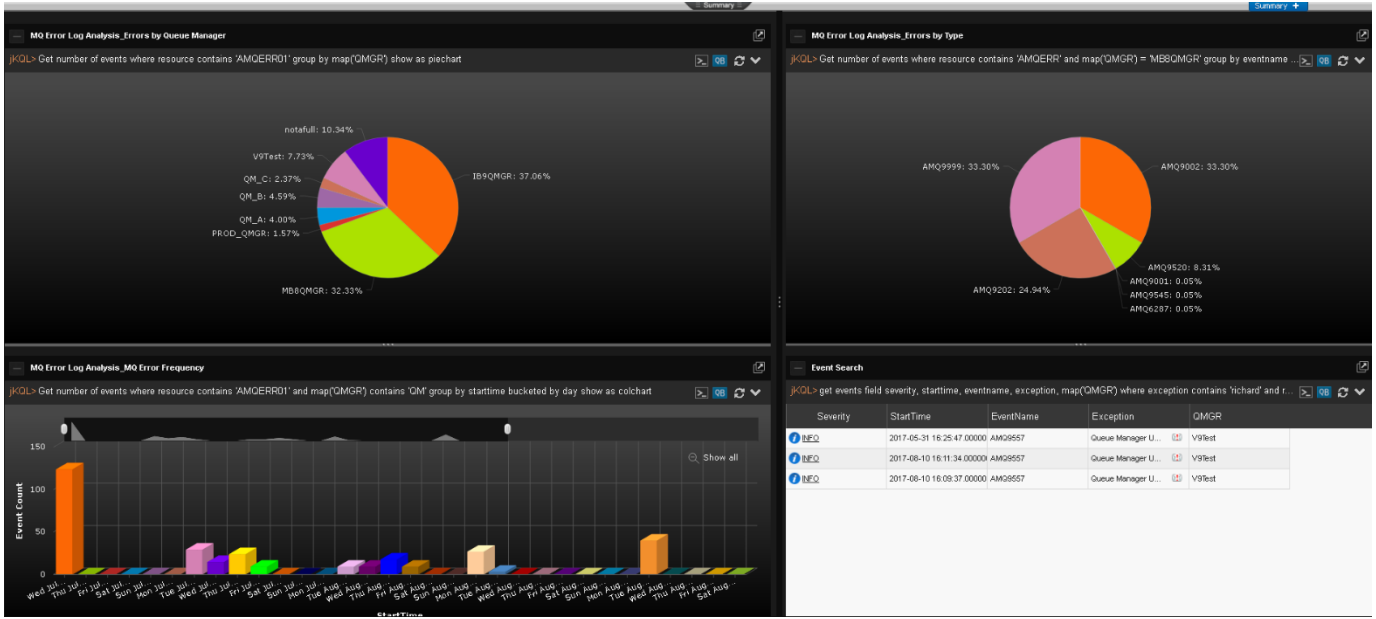
- Pre-defined & User-Defined Dashboards with intuitive KPI's
- Policy-based, Wizard-built monitoring
- No scripting
- Dynamic Thresholds & Automatic Baselining
- Alerts, Notifications & Automated Actions
- Real-time and historical analysis

AutoPilot - Message Transaction Tracking of IBM MQ

- Graphical views of MQ Message Flow transactions
- Categorize MQ message flows (e.g. by Business Unit, application type)
- Pinpoint message delivery problems, message latency and SLA breaches
- Criteria-based message search
- Message tracking information stored in NoSQL database
- Real-time and historical analysis

Log Analytics – MQ/IIB and any other logs

- Centralized access to logs from queue managers and brokers
- Analyze trends
- Search for specific content or conditions

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AutoPilot® for IBM MQ
IBM MQ Configuration
& Message Management
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IBM MQ Stakeholders

Middleware Team

- DEV, TEST & PROD
- Management of messaging backbone

Application Support

- Faster time to repair (MTTR)
- Identify root cause of MQ issues

Application Developers

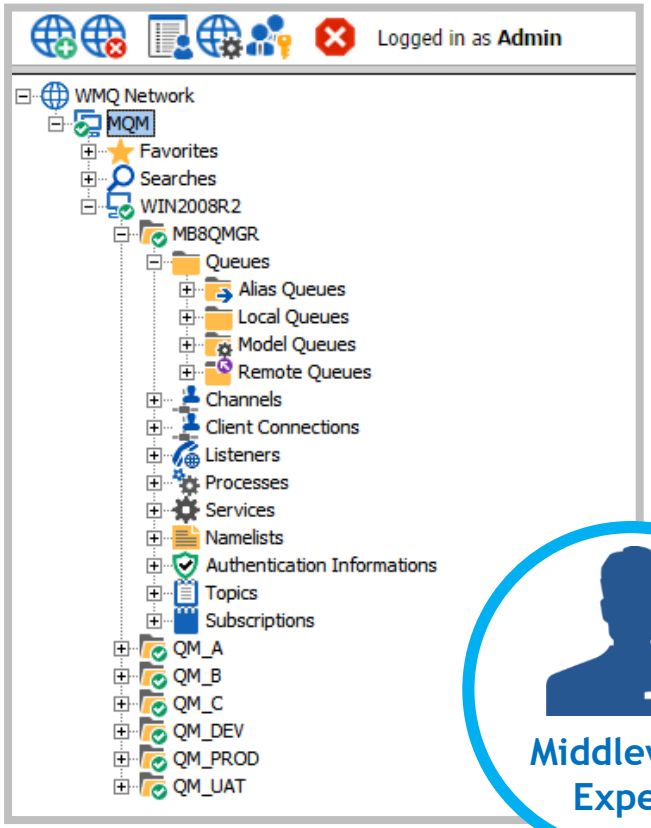
- User Acceptance Testing
- Improve quality of new releases of applications

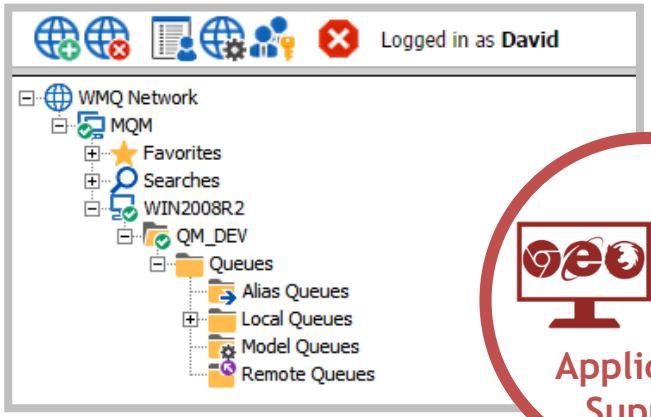
Enterprise Architects

Application Owners

- Improve processes
- Reduce costs
- Prevent performance problems

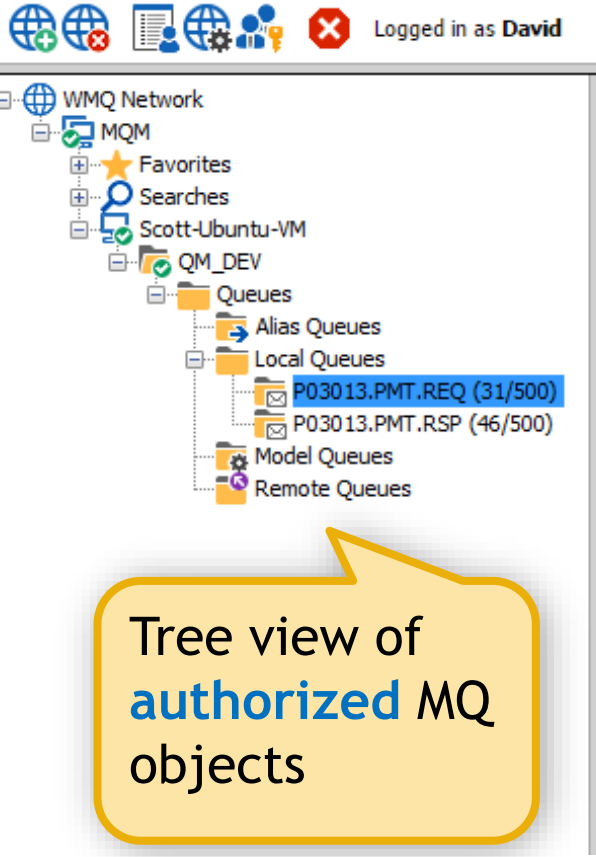
Targeted delegation of access rights



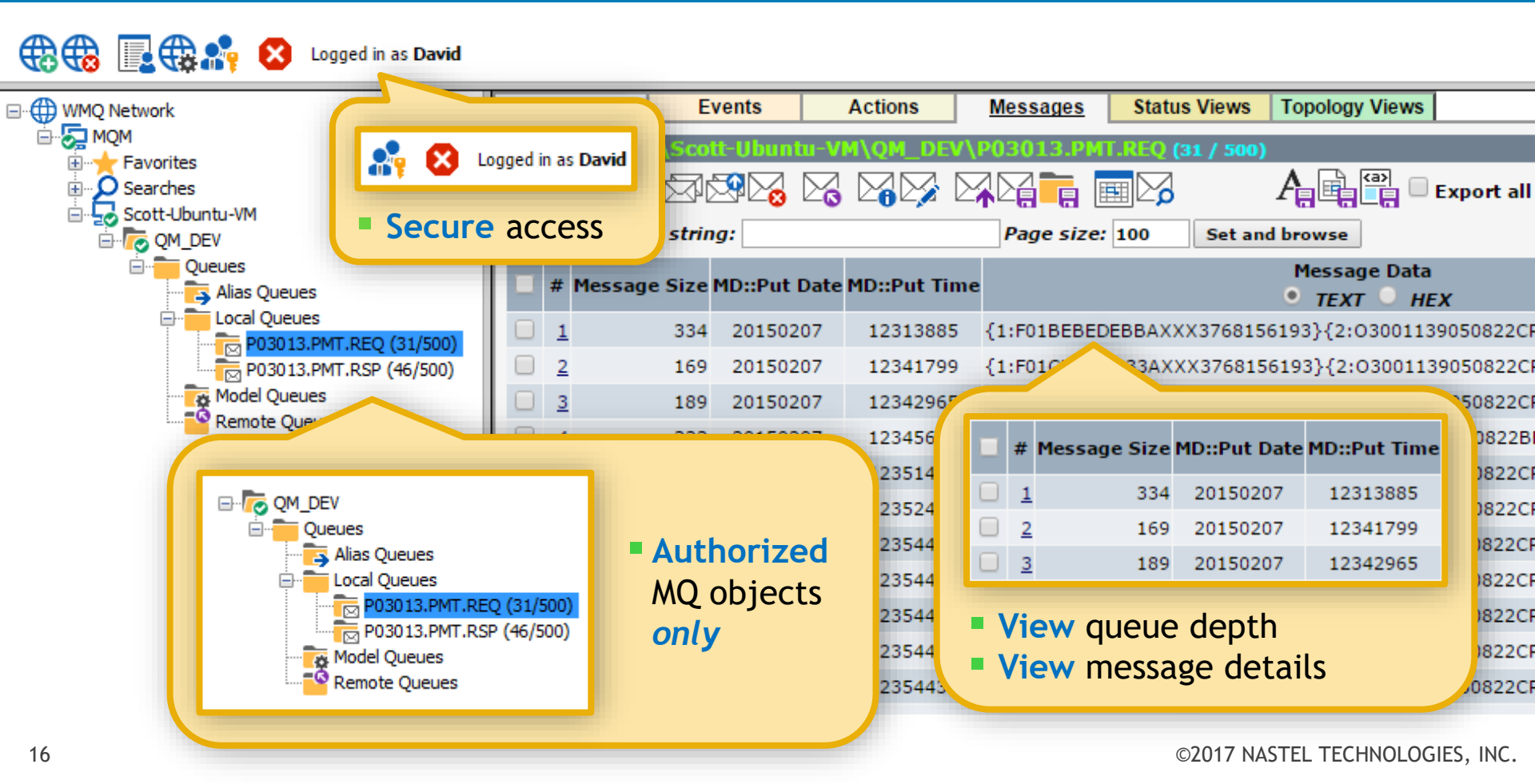


- **Safe**: protect MQ estate
- **Secure**: highly granular, role-based security
- **Simple**: delegate selected tasks to Dev/Ops teams
- **Scalable**: to a large number of users

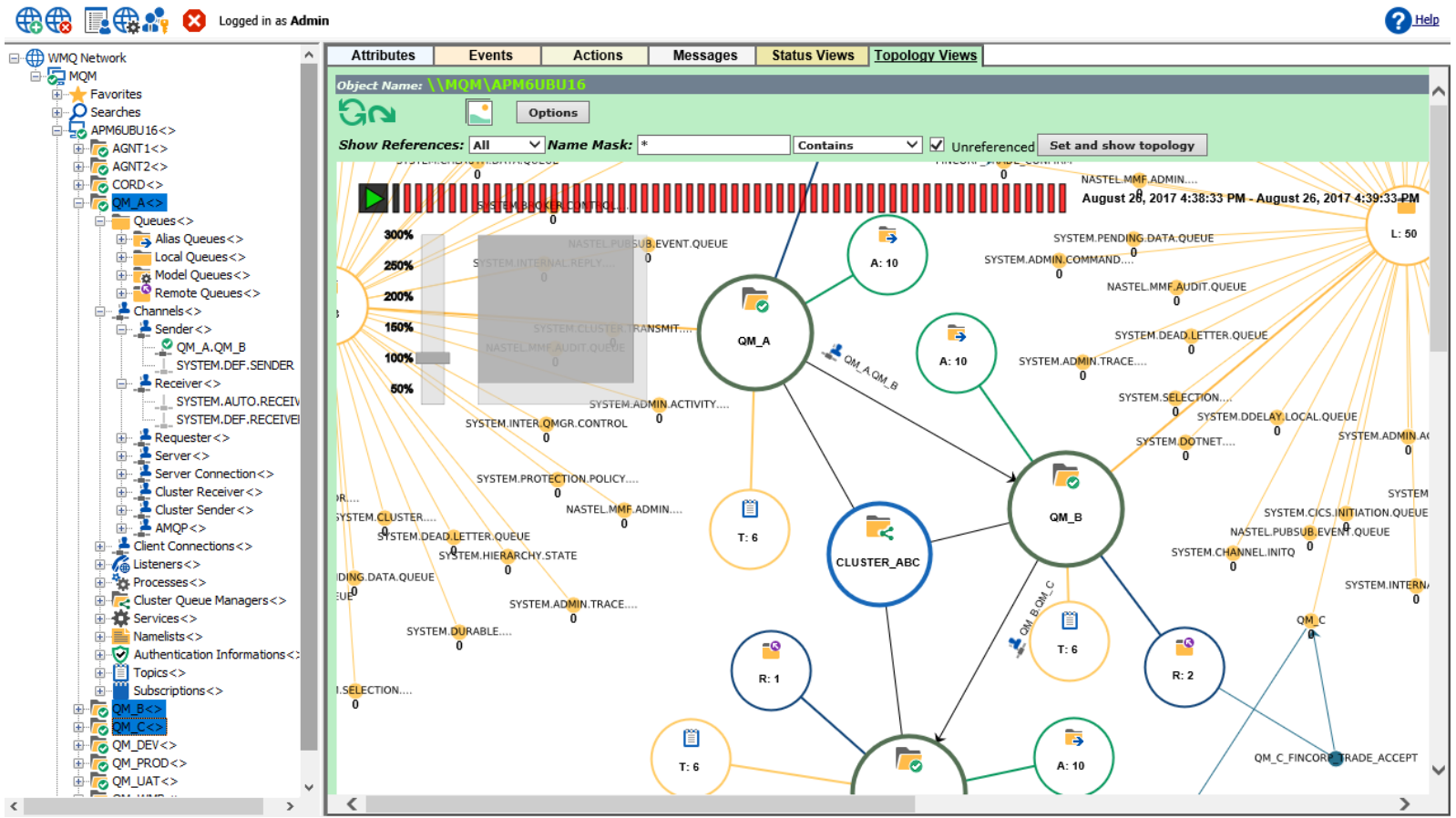
Secure access … for viewing authorized objects



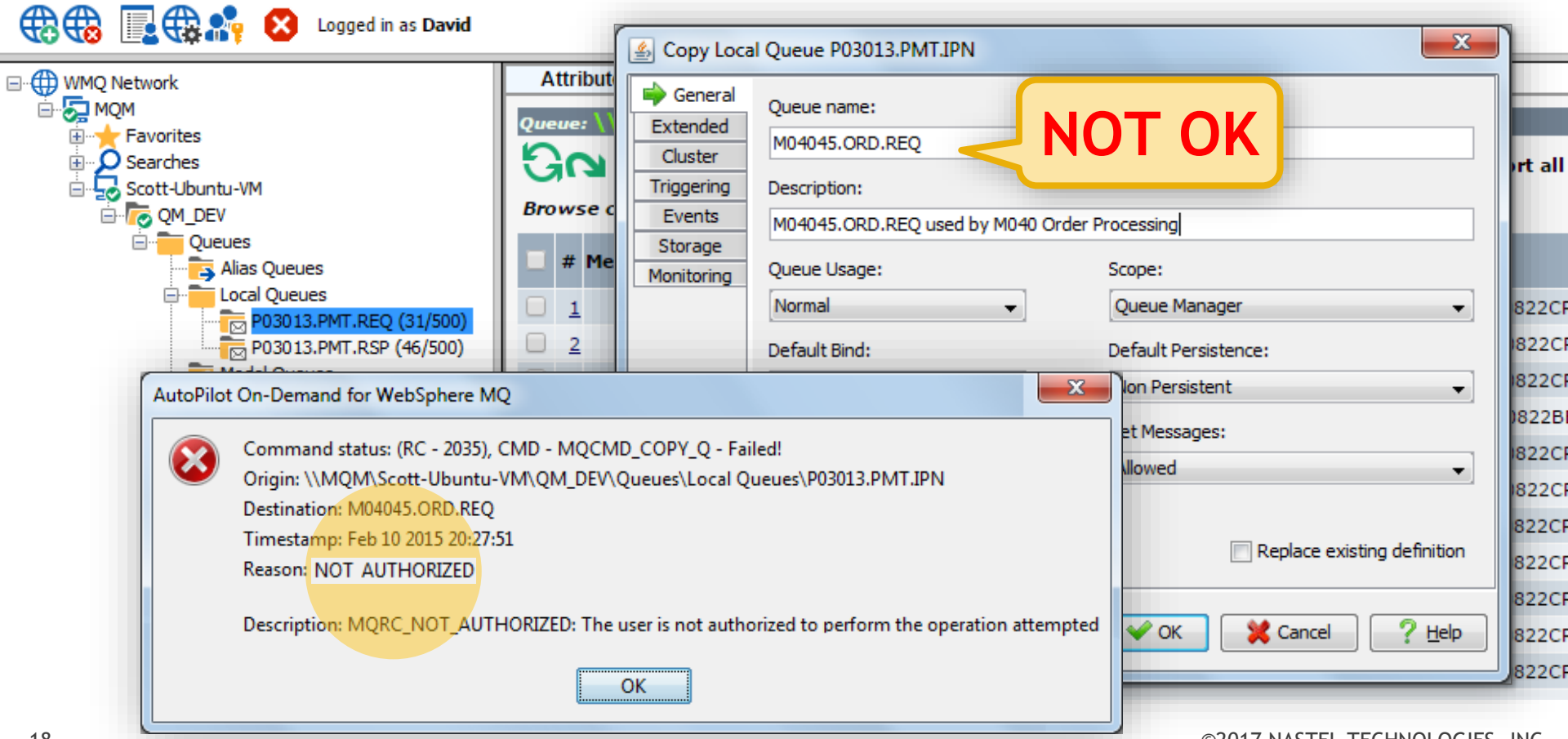
Secure access … for viewing authorized objects



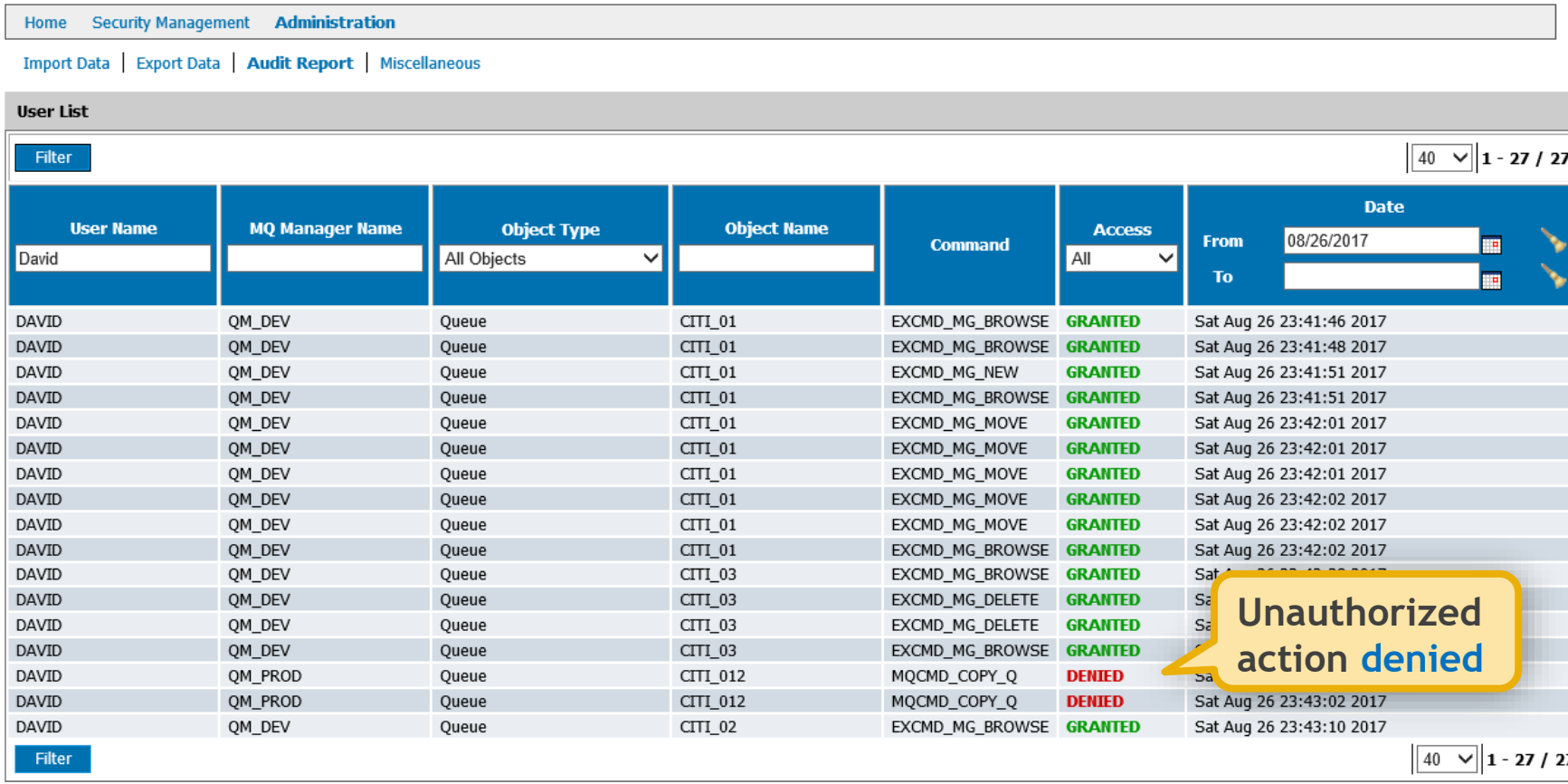
MQ Topology View



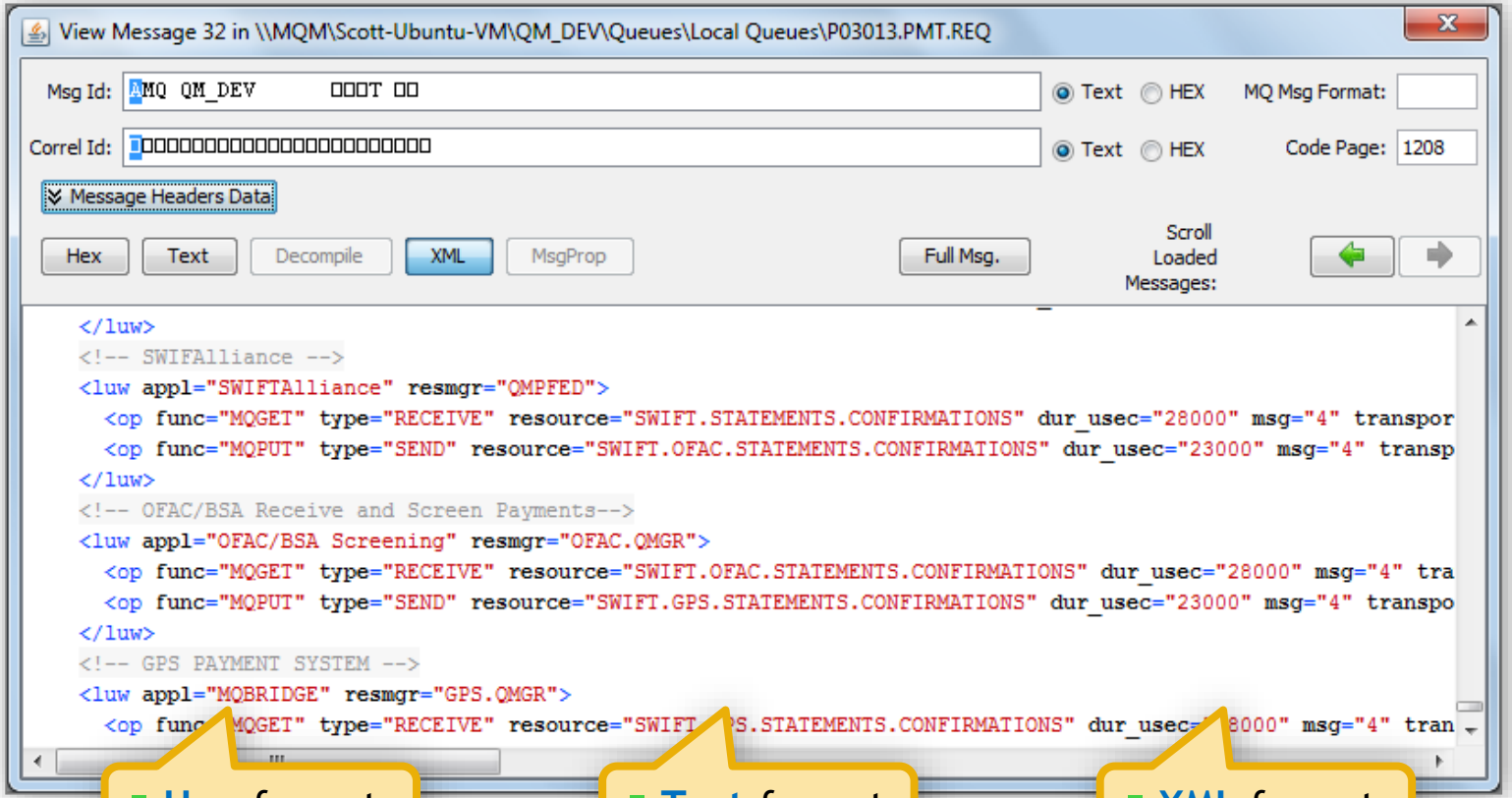
Secure access … for authorized actions



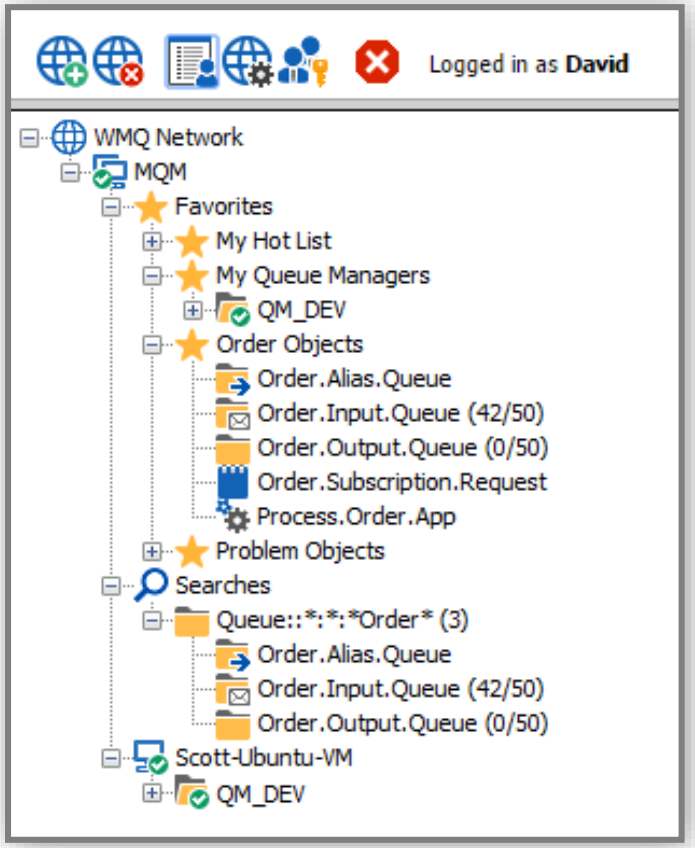
Audit Trail

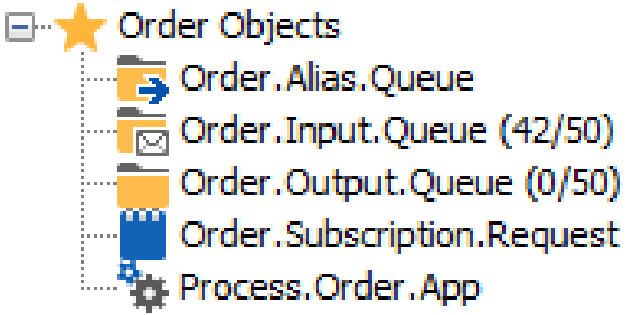


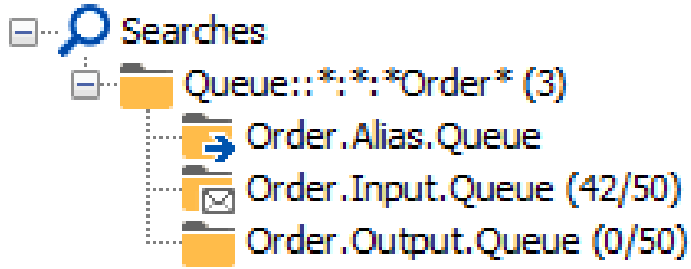
Secure Access to Messages



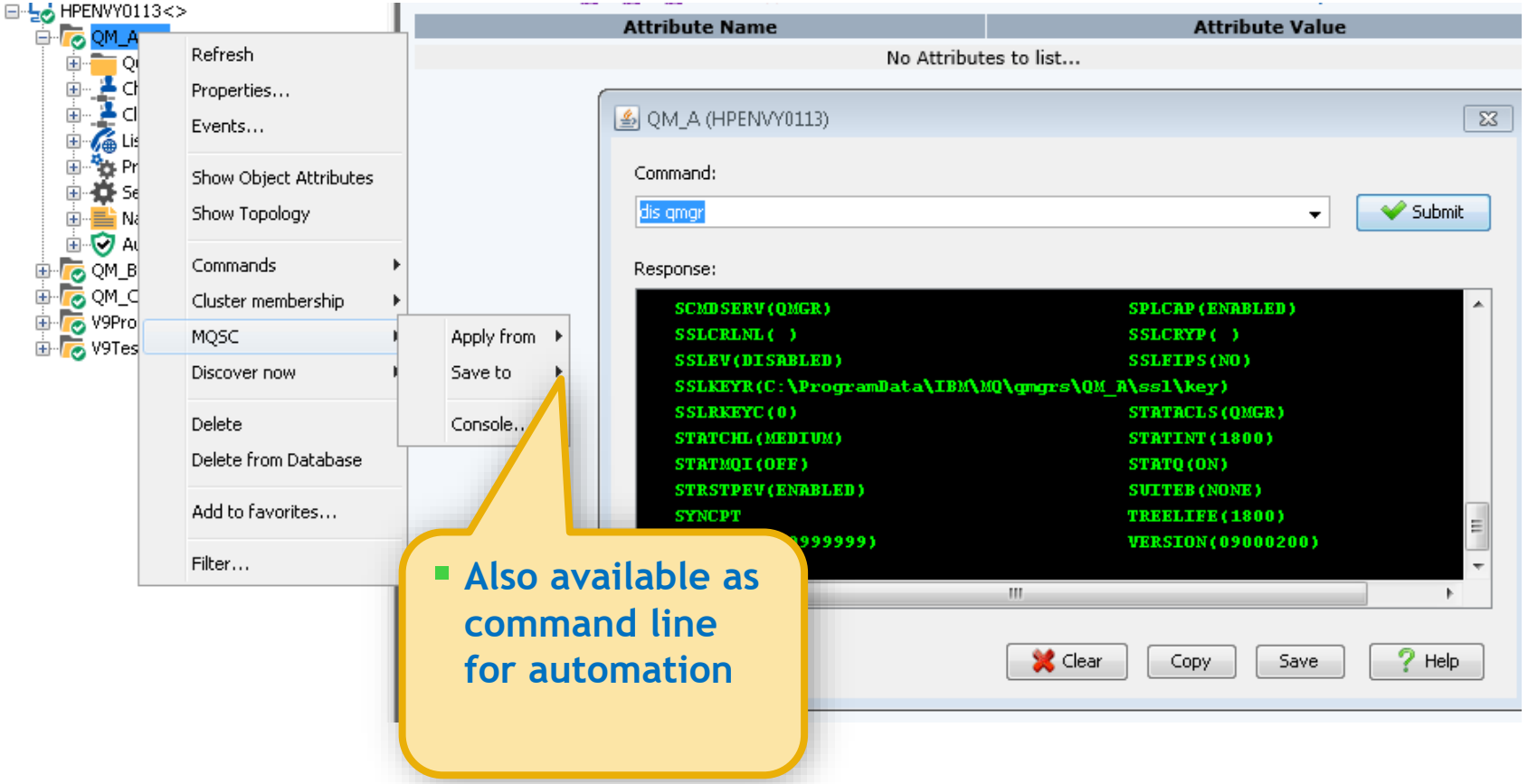
Favorites and Searches







MQSC Export/Import and Console

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Forensic Investigation
Unique features of AutoPilot Insight
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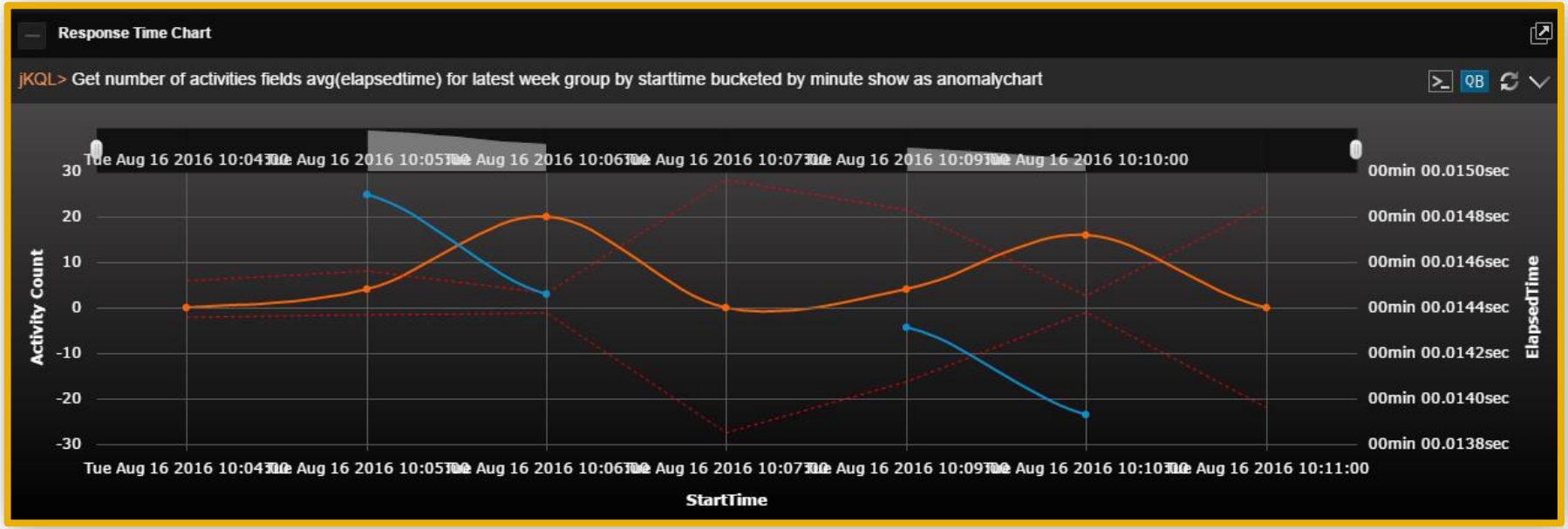
Natural query language

- AutoPilot Insight English like query language lets you analyze transactions, logs, performance and combines data query with visualization in a single statement
  - Get number of events show as linechart

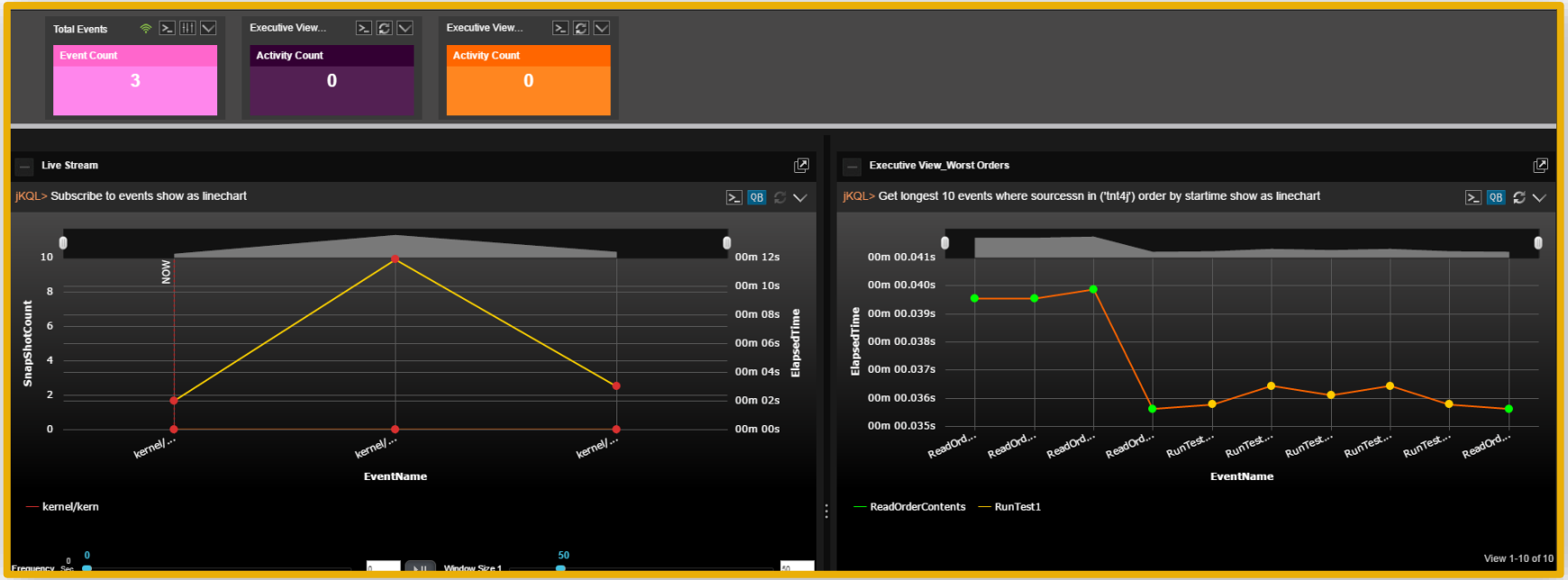


Natural query language

- Ability to ask any question about application performance, logs, transaction and metrics using JKQL English like query language.

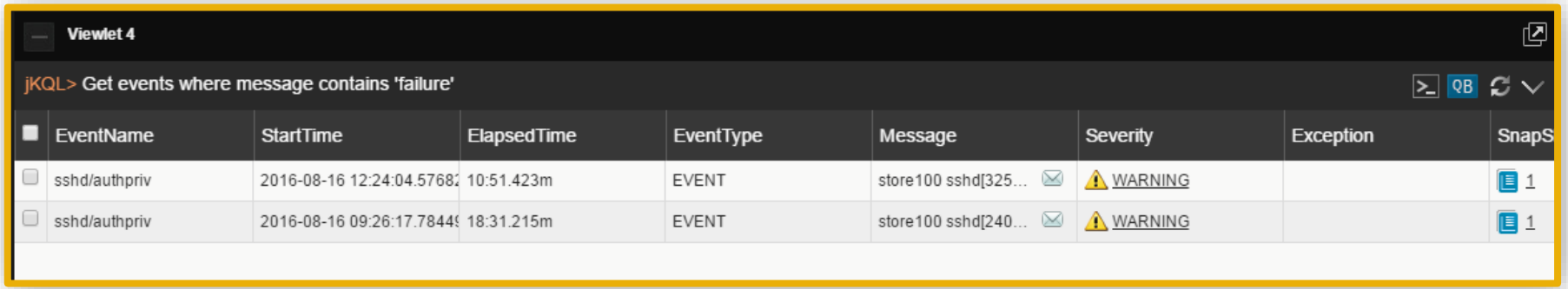
Subscribe function for streaming time series data

- AutoPilot Insight lets you subscribe to APM data using JKQL “subscribe” queries.
  - “Subscribe to number of events group by location show as summary”
  - Developers can write streaming, query apps using our open source API
  - https://github.com/Nastel/jKoolRestClients#running-jkool-queries-asynchronously



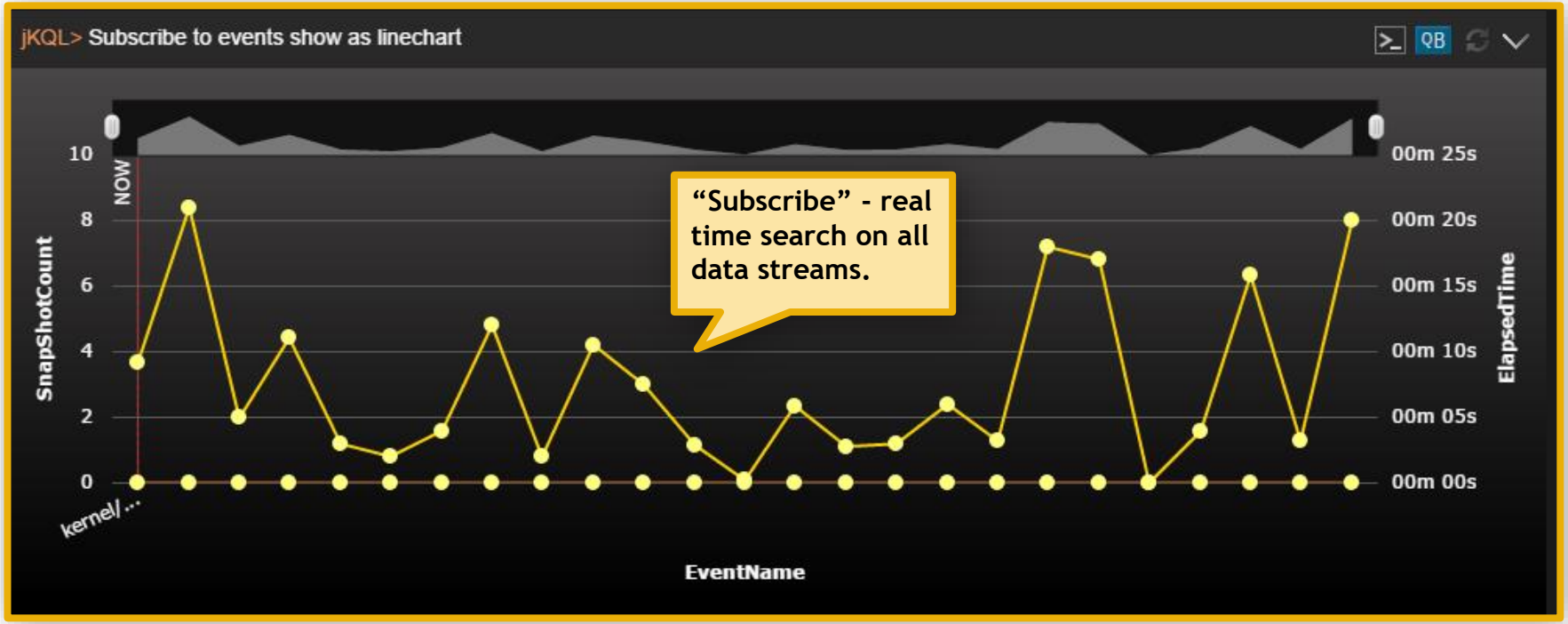
Flow tracking, Log Analytics and Monitoring

- AutoPilot Insight can track transactions, performance as well as message and transaction payload, as well as logs.
  - Example of how someone might search for a specific order from command line:
    - JKCmd –search “failure” –file args.file
    - JKCmd –query “get number of events where message contains ‘failure’” –file args.file



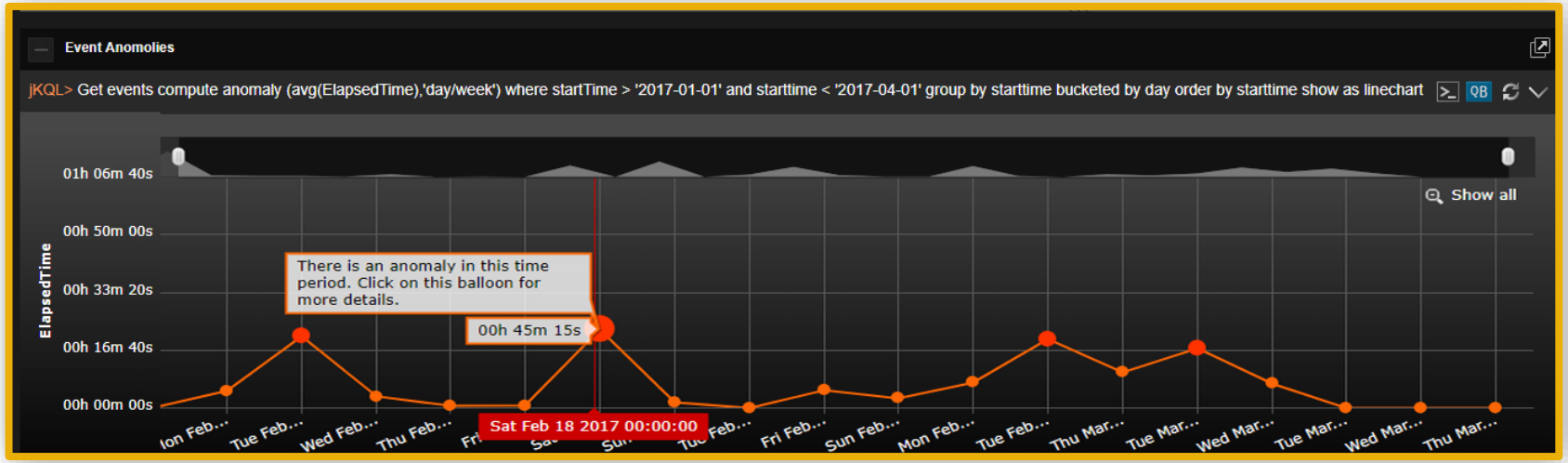
Real time continuous search on all data streams

- Use AutoPilot Insight “subscribe” capability to run real-time continuous searches against all data streams.



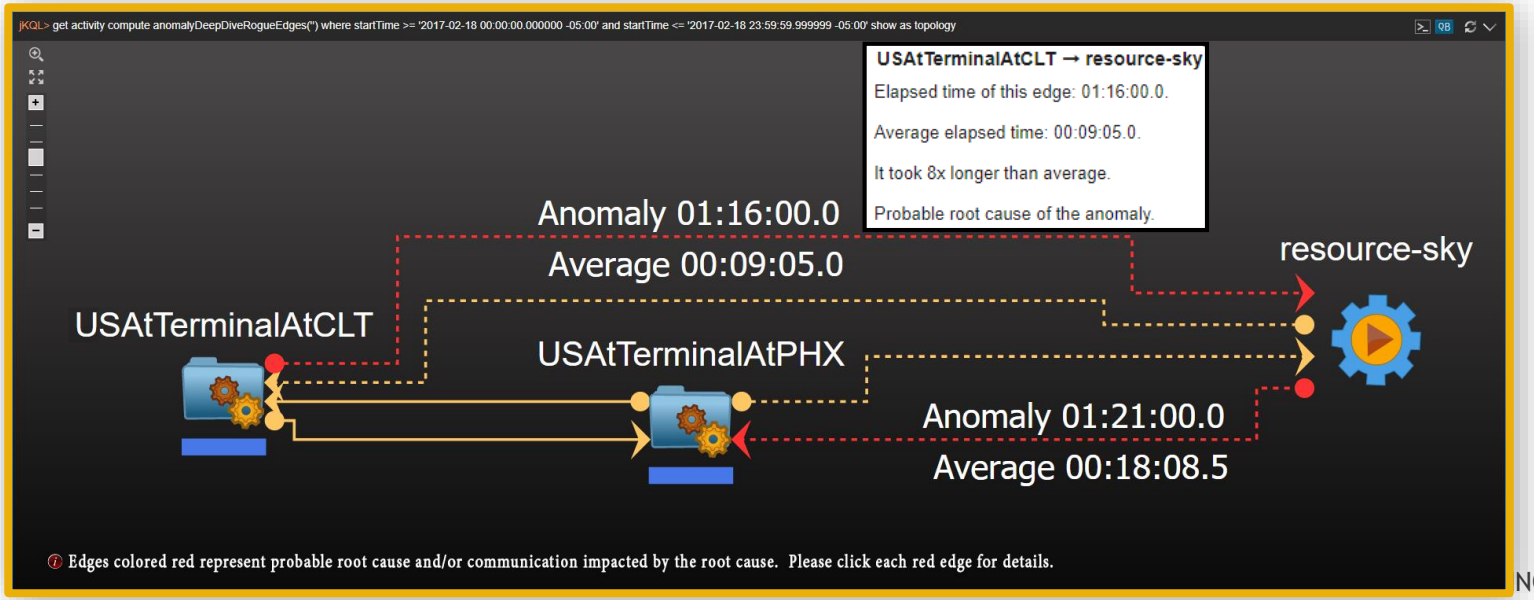
Machine Learning, Anomaly Detection & Root Cause Analysis

- Detecting anomalies - algorithm based on Robust Principal Component Analysis
- No learning rules required for training
- Viewlets provide drill-down capability for root-cause analysis



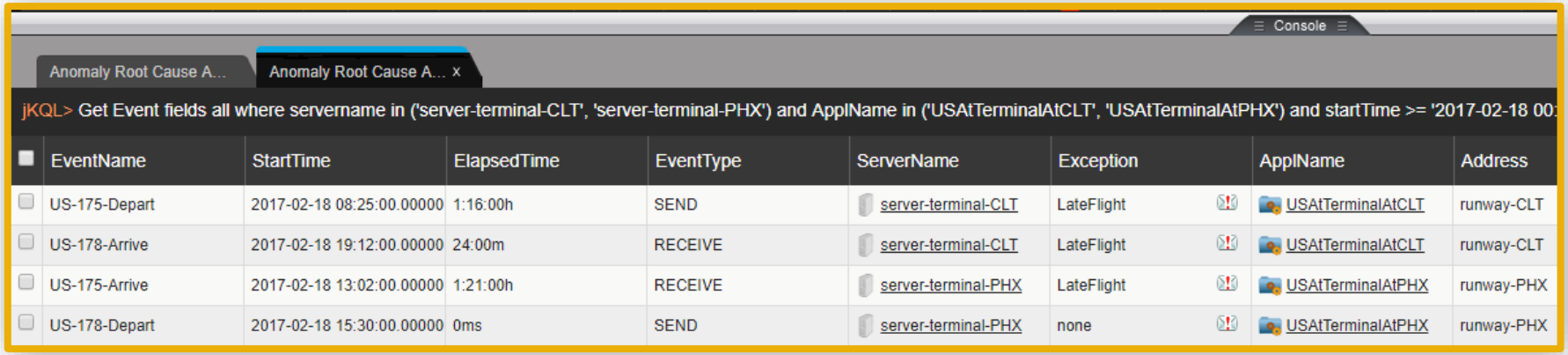
Machine Learning, Anomaly Detection & Root Cause Analysis

- Drilldown to graph of nodes and edges representing topology at time of anomaly
- Topology graph automatically created for all relationships in time window
- Related nodes are automatically stitched together
- Lines between nodes (called “edges”), represent relationships between nodes



Machine Learning, Anomaly Detection & Root Cause Analysis

- Drilldown to events - looking at all relationships from the graph, we detect which edges are significantly different than their statistical average for the time window (configurable)
- The worst “edge(s)” are the potential root cause.



EventName	StartTime	ElapsedTime	EventType	ServerName	Exception	ApplName	Address
US-175-Depart	2017-02-18 08:25:00.00000	1:16:00h	SEND	server-terminal-CLT	LateFlight	USAtTerminalAtCLT	runway-CLT
US-178-Arrive	2017-02-18 19:12:00.00000	24:00m	RECEIVE	server-terminal-CLT	LateFlight	USAtTerminalAtCLT	runway-CLT
US-175-Arrive	2017-02-18 13:02:00.00000	1:21:00h	RECEIVE	server-terminal-PHX	LateFlight	USAtTerminalAtPHX	runway-PHX
US-178-Depart	2017-02-18 15:30:00.00000	0ms	SEND	server-terminal-PHX	none	USAtTerminalAtPHX	runway-PHX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IT Operations Use Case
Susan is the senior IT operations manager, responsible for monitoring applications and alerting the IT organization when anomalies are detected in terms of response times and service levels.
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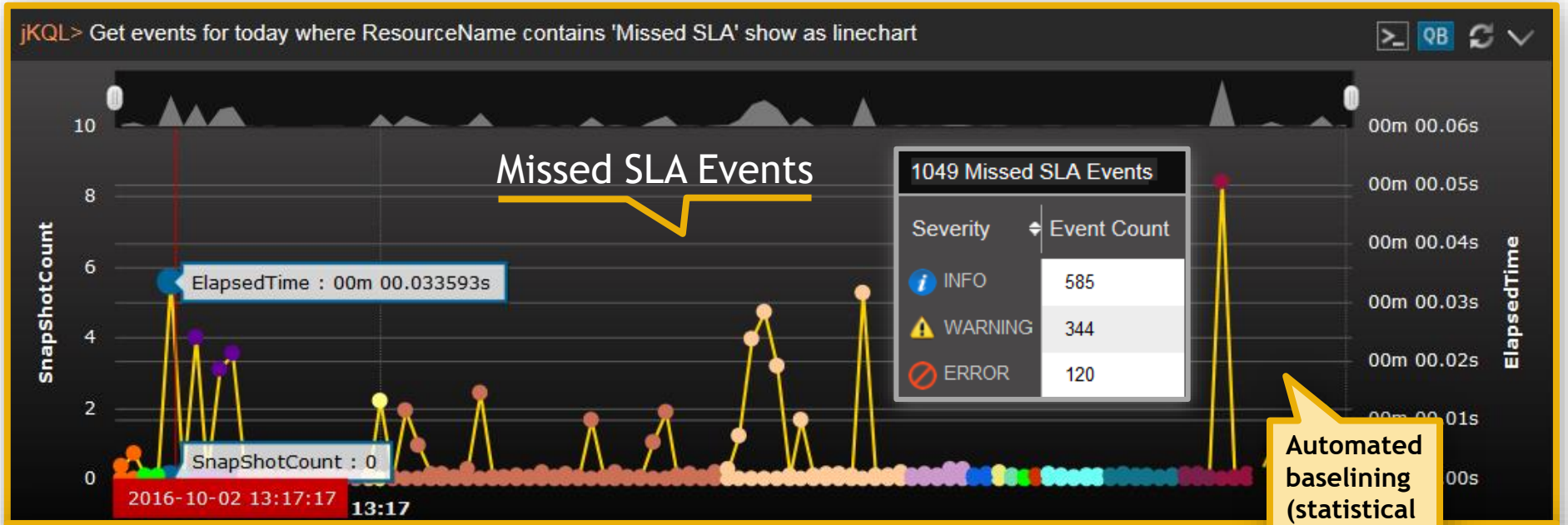
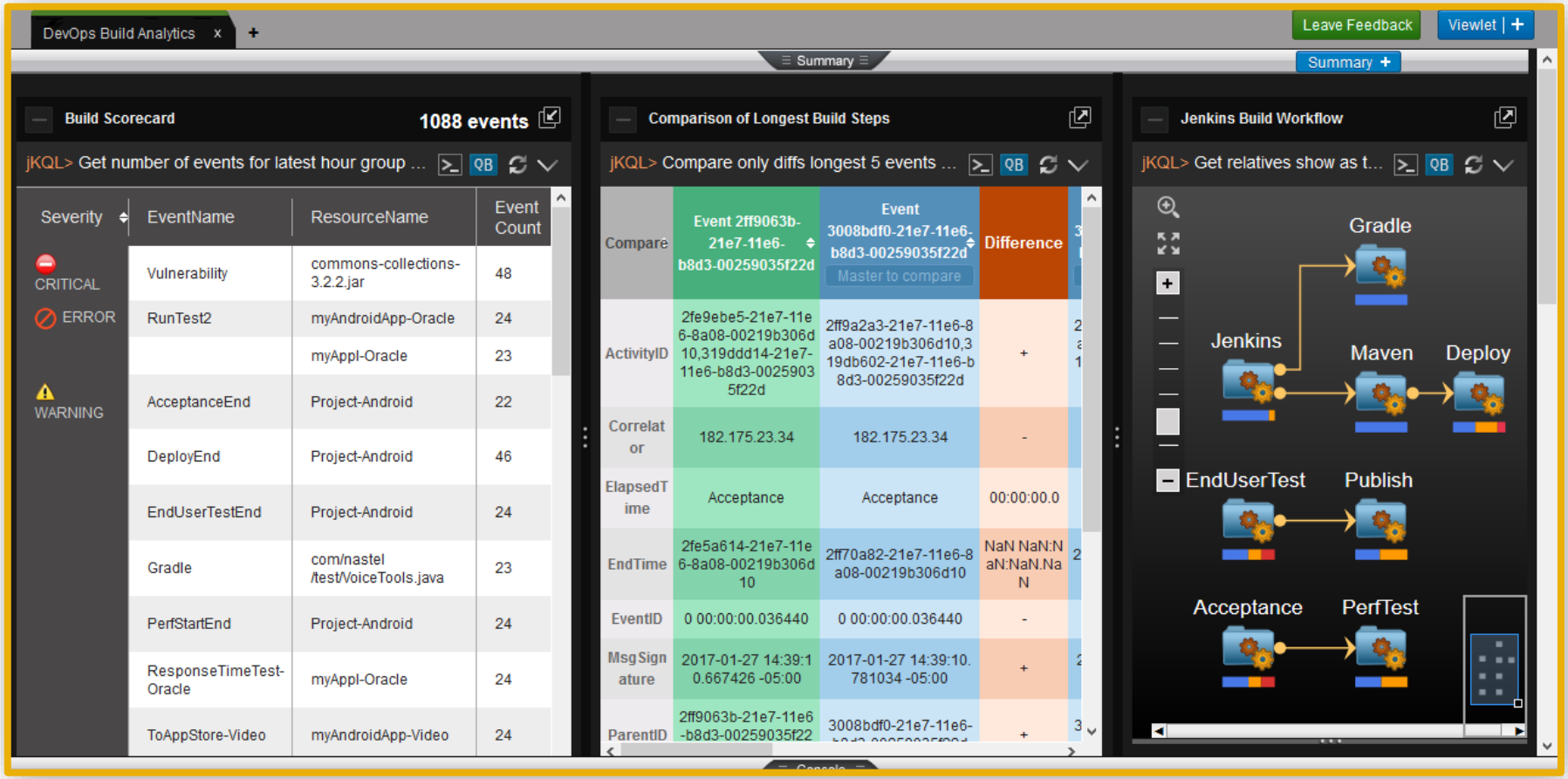
Use automated transaction baselining to set SLA's



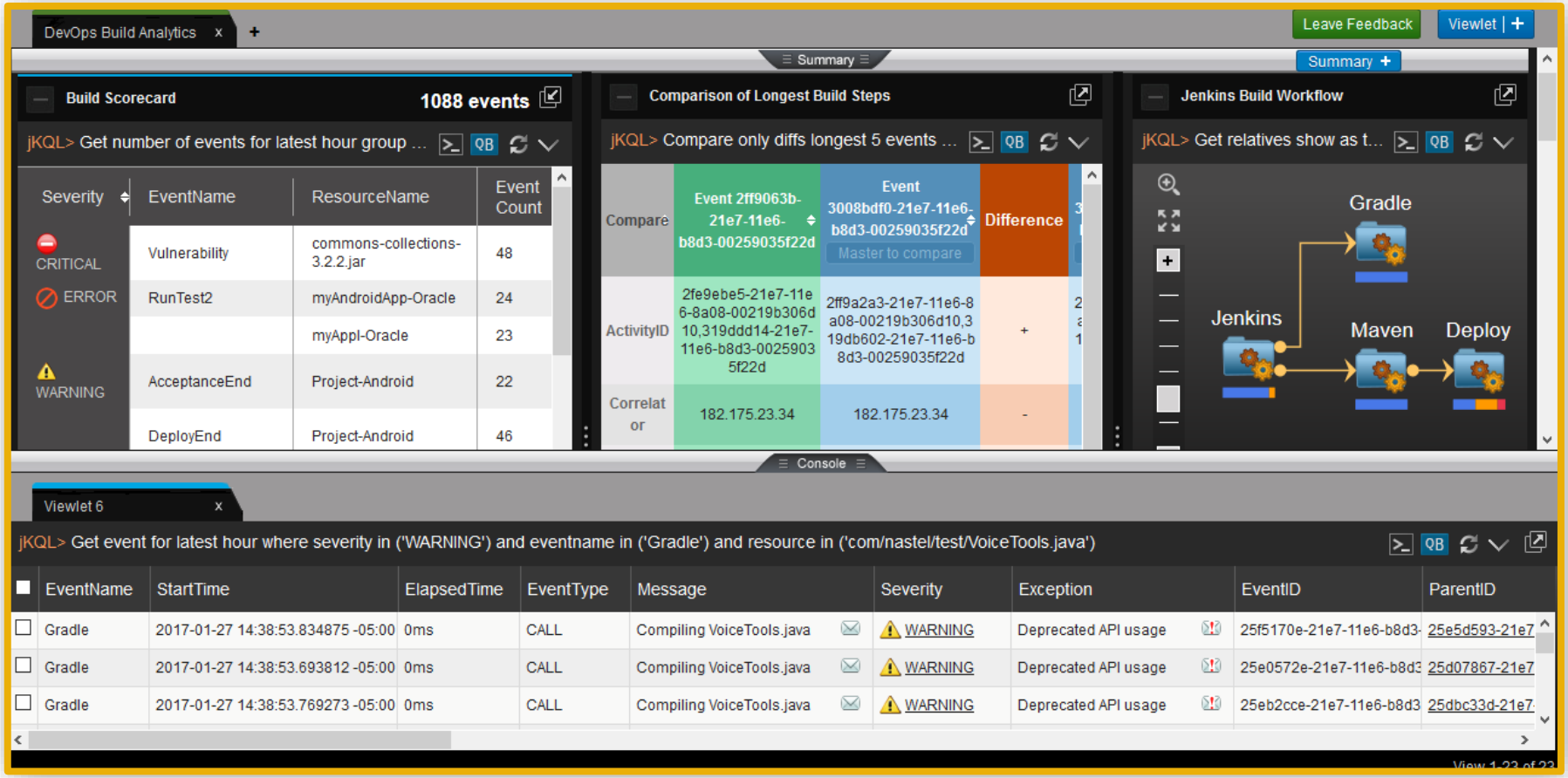
EventName	StartTime	ElapsedTime	EventType	Message		SourceFQN
ReadOrder	2016-05-24 21:30:35.548116 +02:00	25ms	RECEIVE	Process Payment ProductId=8380203...	WARNING	APPL=Proces
ReadOrder	2016-05-24 21:30:48.542458 +02:00	27ms	RECEIVE	Process Payment ProductId=8380203...	WARNING	APPL=Proces
ReadOrder	2016-05-24 21:30:35.548116 +02:00	25ms	RECEIVE	Process Payment ProductId=8380203...	ERROR	APPL=Proces

Monitor a planned update to application architecture

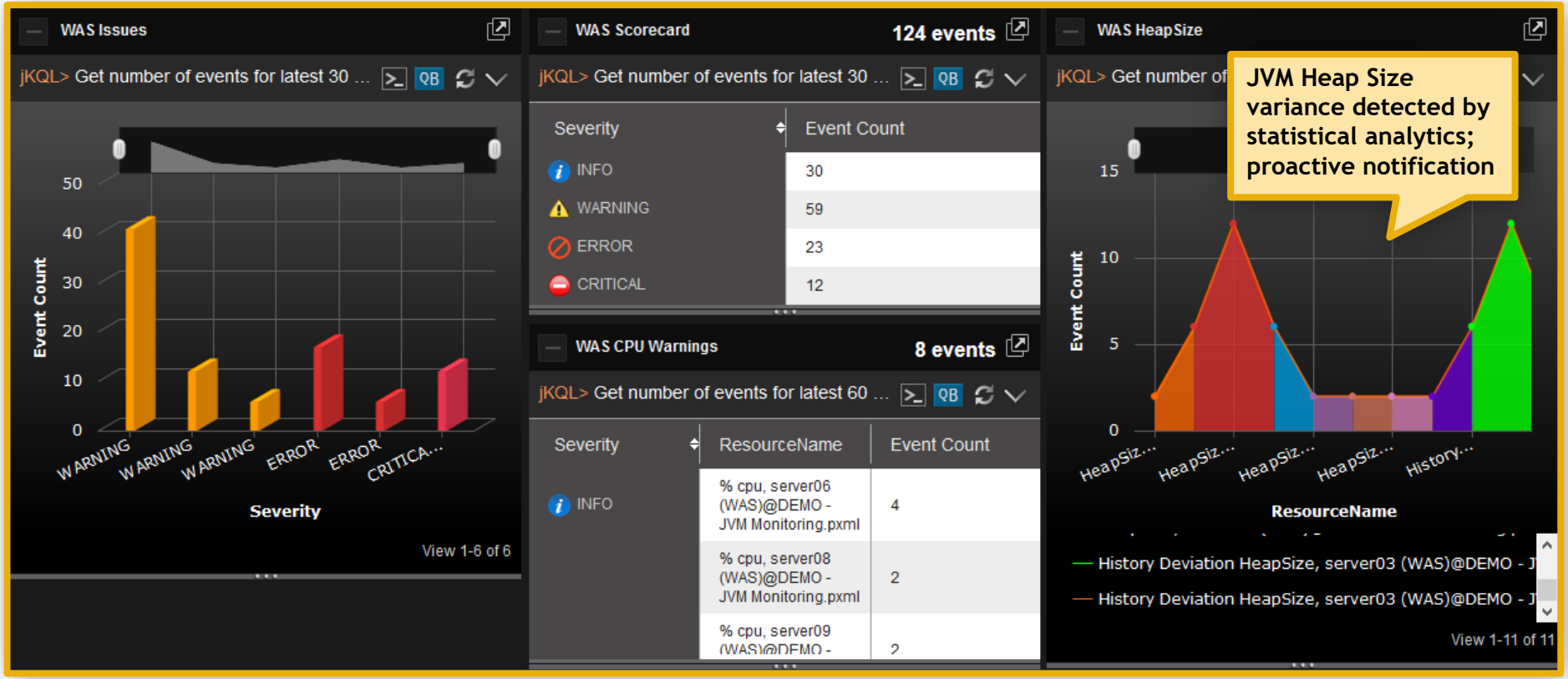
Monitor a planned update to application architecture



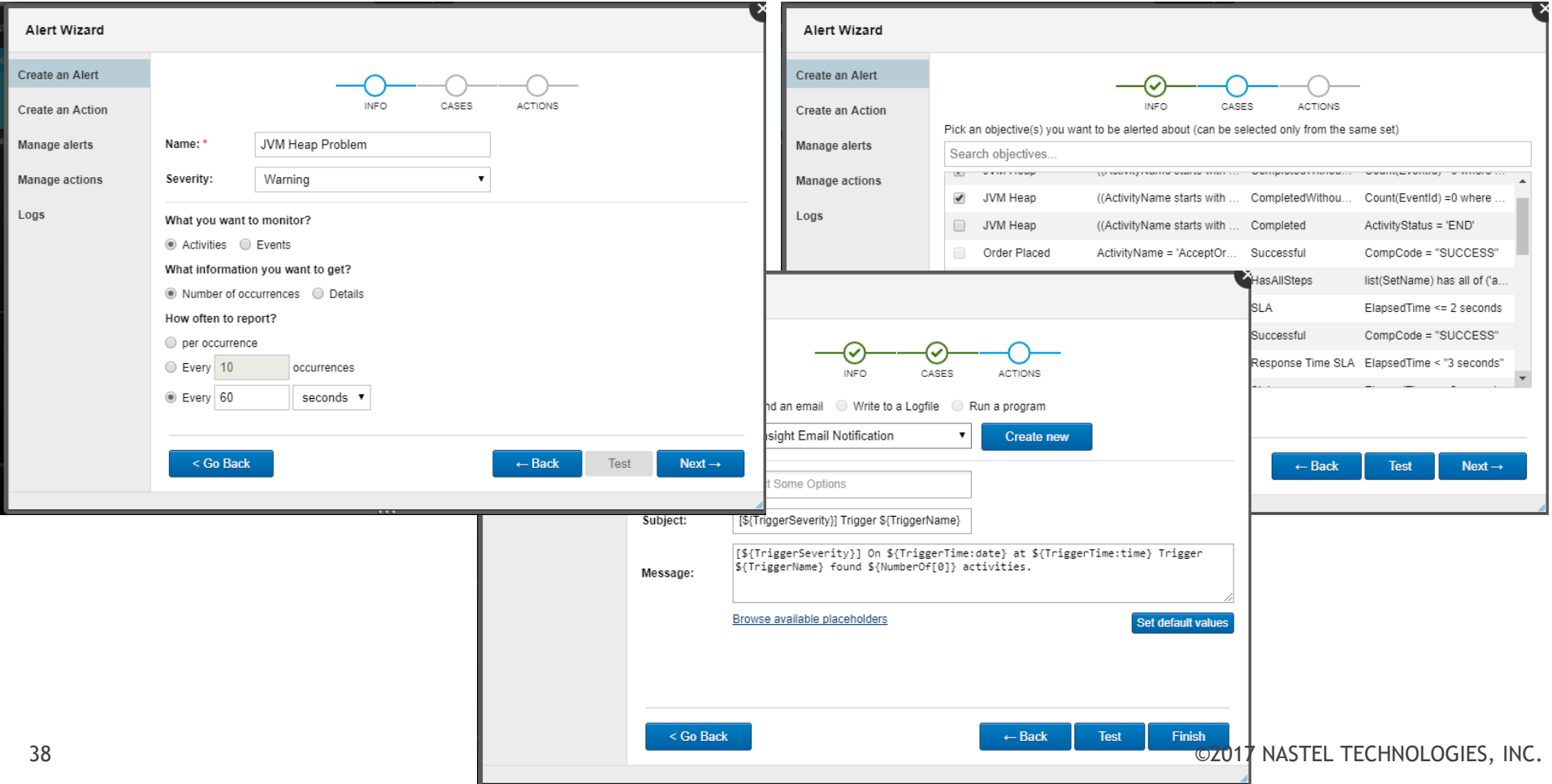
Monitor a planned update to application architecture



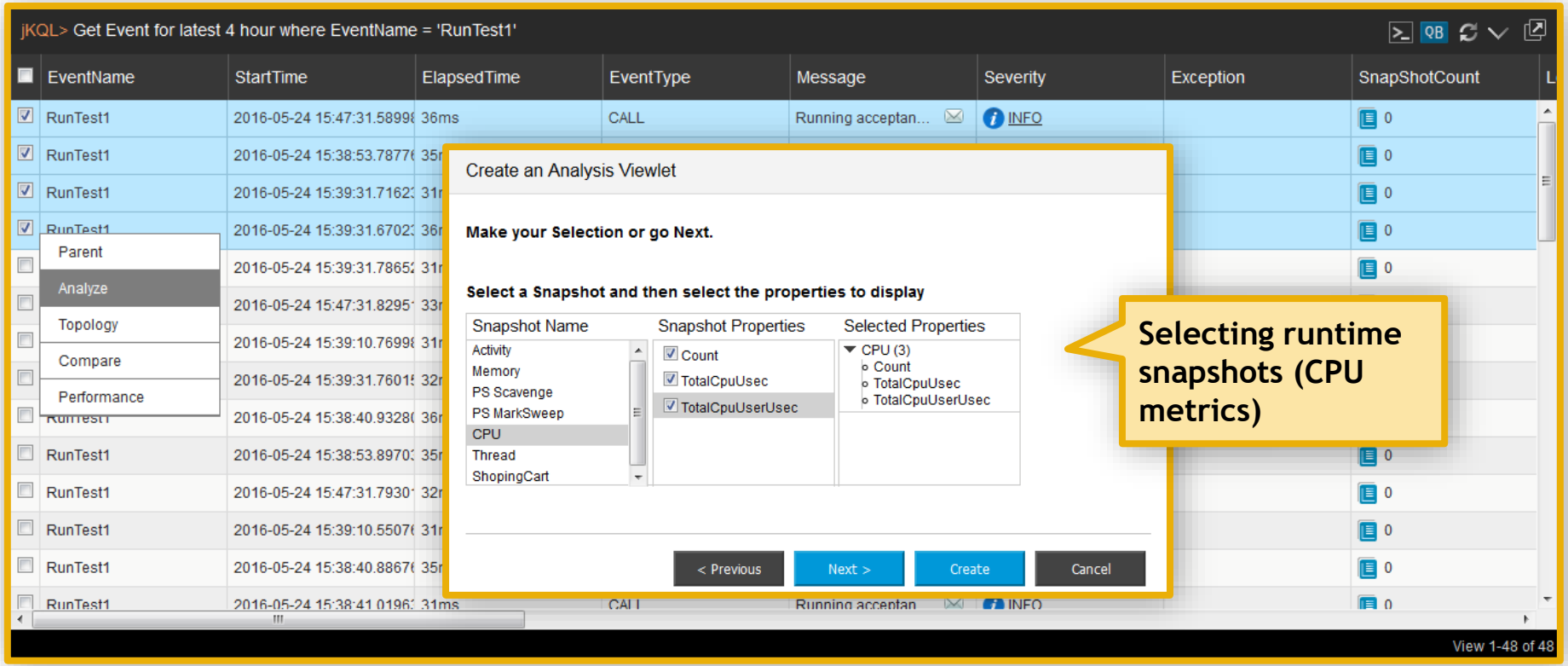
Notification of an impending problem



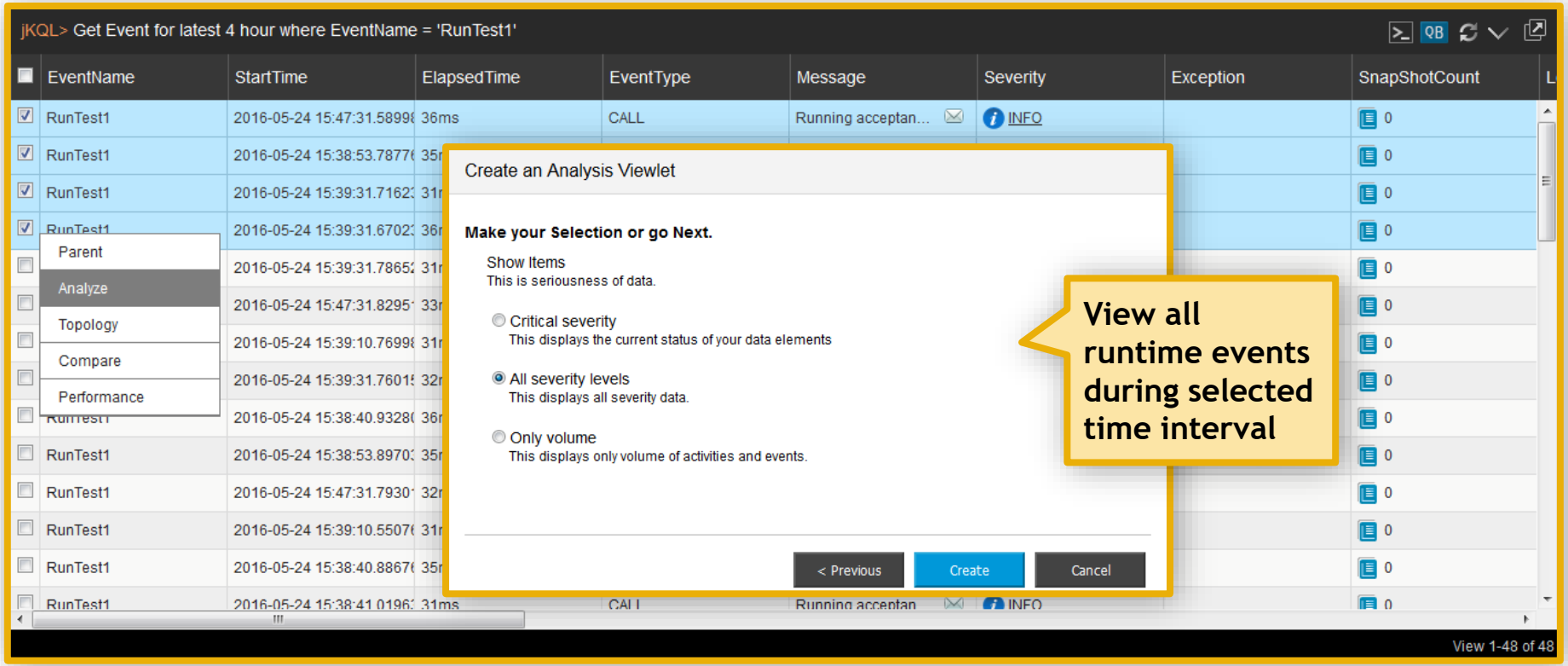
Alert Wizard Creates Notifications about MQ Problem



Performance problem due to "CPU stealing"



Performance problem due to "CPU stealing"



Performance problem due to "CPU stealing"

Business Analysis Use Case

Emma, vice president of the digital business marketing organization, is focused on metrics that show how the business is performing . She expects IT to notify her of problems before they begin to impact customer behavior.

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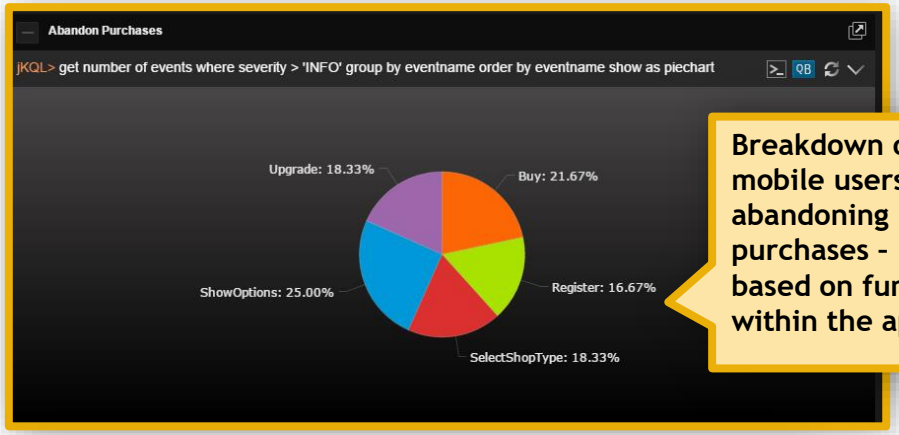
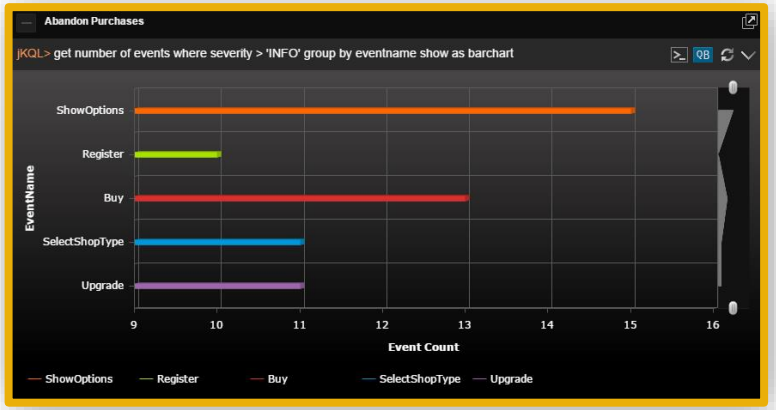
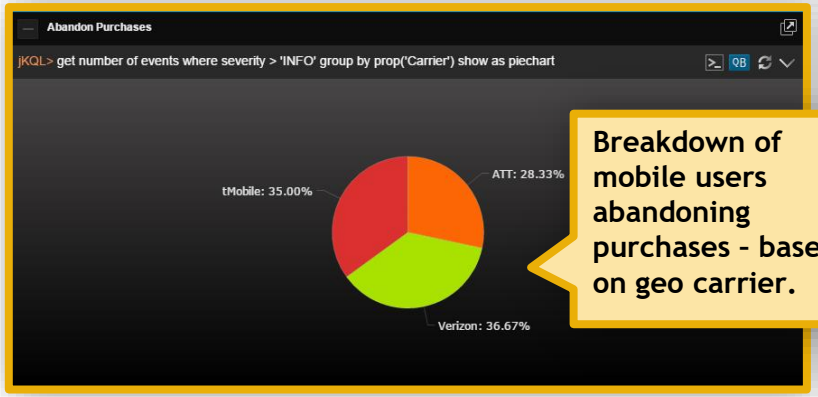
Determine where mobile users abandon online purchases

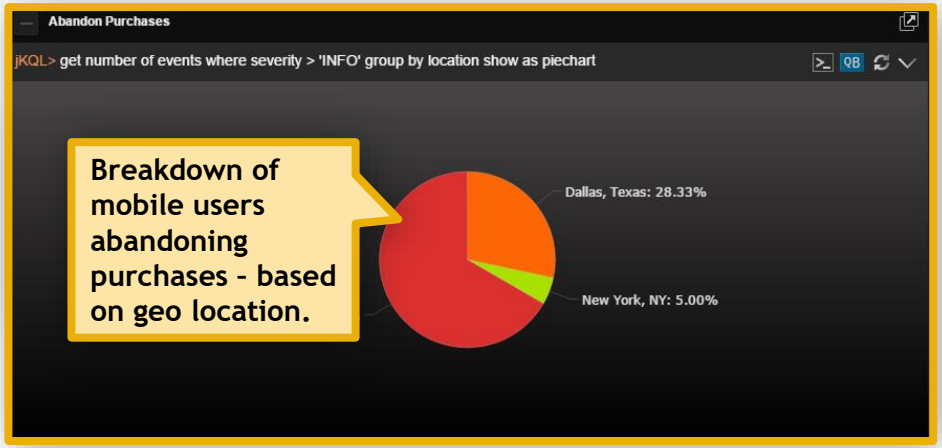


Breakdown of mobile users abandoning purchases - based on funnel within the app.



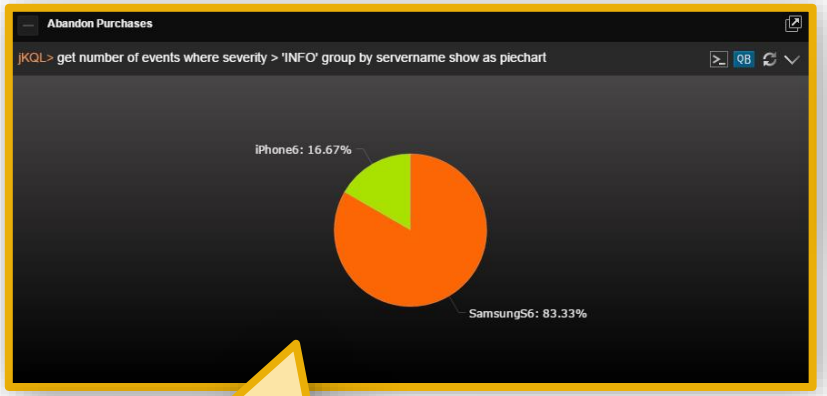


Breakdown of mobile users abandoning purchases - based on geo carrier.

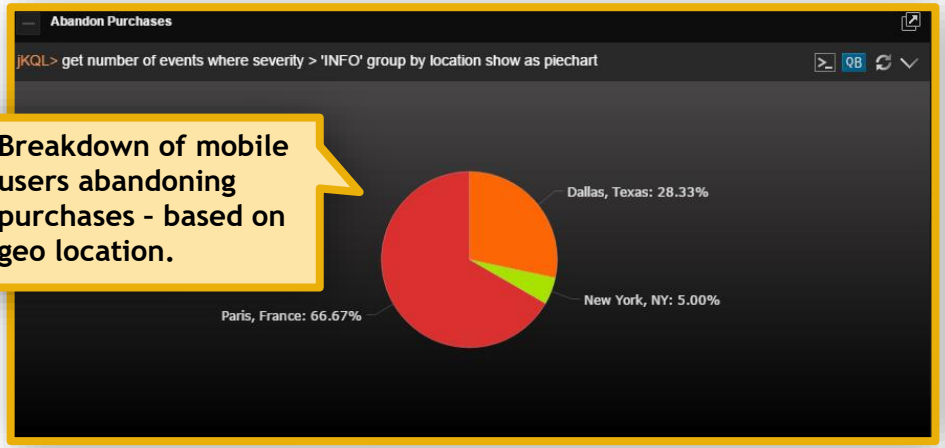


Breakdown of mobile users abandoning purchases - based on geo location.

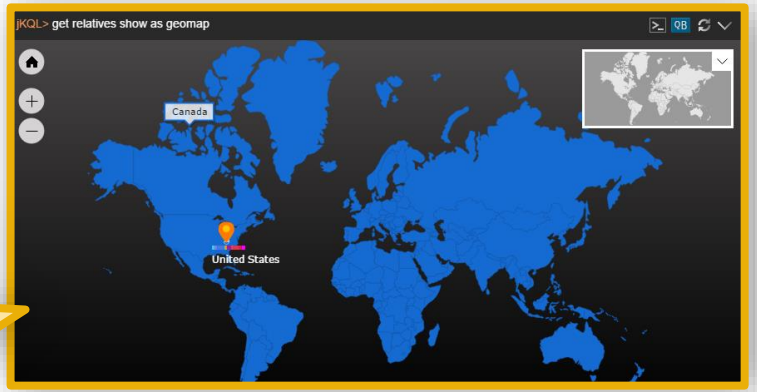
Abandoned purchases (e.g. users, devices, geographies)

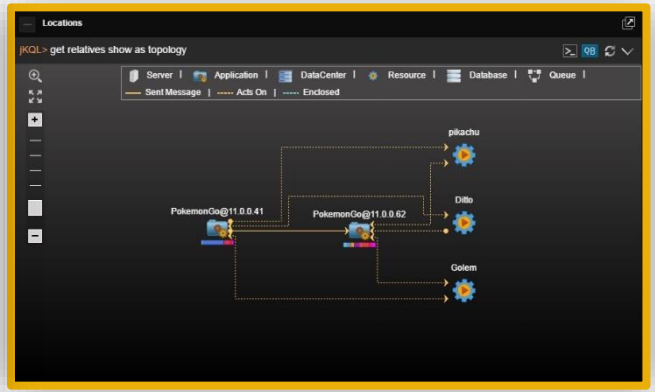


Breakdown of mobile users abandoning purchases by device type/name.



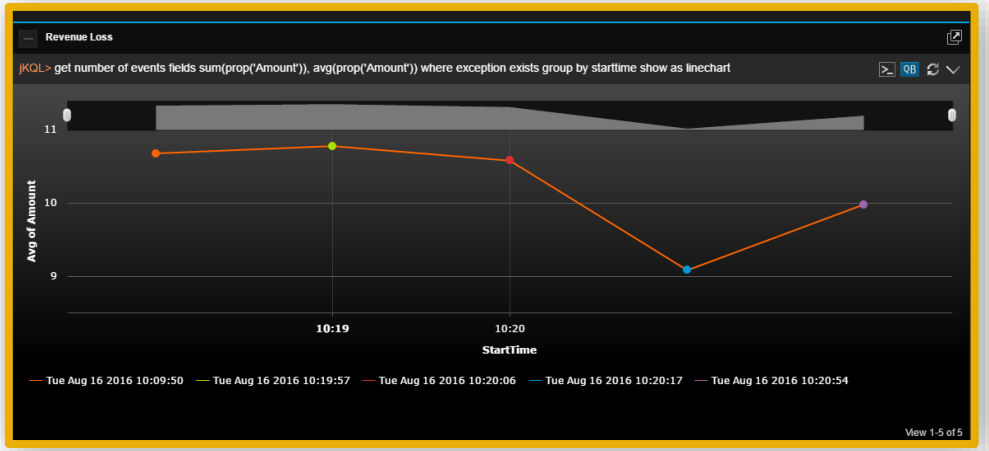
Breakdown of mobile users abandoning purchases - based on geo location.

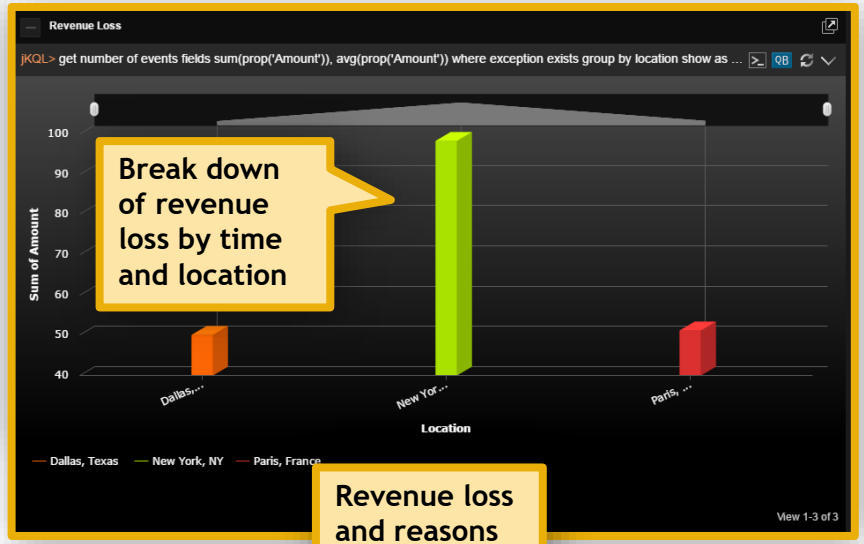




Geo maps and transaction topology of where and how abandonment happens.

Revenue potentially lost due to performance problems





Revenue loss and reasons why

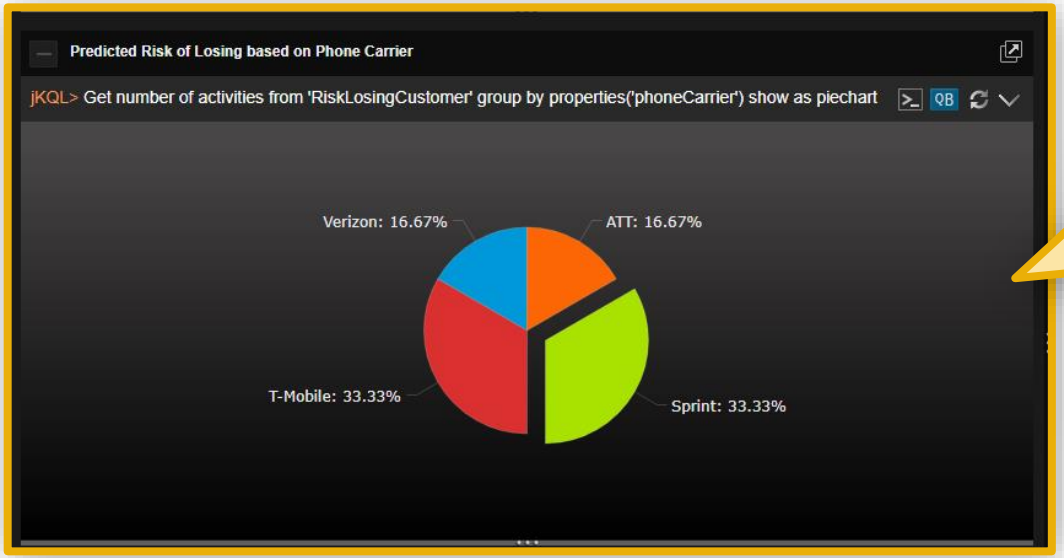
Dill down into all events responsible for revenue loss

jKQL> Get event for Today where exception exists and location in('Paris, France')

EventName	StartTime	ElapsedTime	EventType	Message	Severity	Amount	Exception
Buy	2016-08-16 10:10:10.5870(	0ms	CALL	Buy pokemon.coin...	ERROR	5.389200000000001	Security Violation
Buy	2016-08-16 10:10:10.5969:	0ms	CALL	Buy pokemon.coin...	ERROR	5.2894000000000005	Security Violation
Buy	2016-08-16 10:09:28.0229!	0ms	CALL	Buy pokemon.coin...	ERROR	5.339300000000001	Security Violation
Buy	2016-08-16 10:10:10.6074(	0ms	CALL	Buy pokemon.coin...	ERROR	4.540900000000001	Security Violation
Buy	2016-08-16 10:10:10.6442!	0ms	CALL	Buy pokemon.coin...	ERROR	4.99	Security Violation

How to improve revenue via machine learning

- Bayesian Classification used to automatically determine probability of events
- Bayes algorithm applies learned information to newly streamed data
- Groups data into sets and determines probability



This query retrieves activities from the set “Risk Losing Customer”, which is populated by the Bayes function and grouped by phone carrier

How to improve revenue - Bayes classification and Prediction

- Sentiment analysis is supported by analyzing messages
- Trained via rules to know the difference between customers with negative and positive sentiment, the Bayes algorithm is used to “profile” negative and positive outcomes (cancelled accounts, placed orders)

Learning Rules for Customer Sentiment

jKQL> get set fields setname, classifier, learnquery where classifier contains 'Sentiment'

SetName	Classifier	LearnQuery
NegativeSentiment	CustomerSentiment	Get Event Fields tokenize(message,' ') where name='cancel.account'
PositiveSentiment	CustomerSentiment	Get Event Fields tokenize(message,' ') where name='place.order'

Open source instrumentation

- Streaming Ecosystem -- https://github.com/Nastel/tnt4j-streams
  - HDFS, MQTT, JMS, Node.js, Angular.js, Collectd, Nagios, WebServices, JSON, etc
- RESTFul and WebSocket APIs -- https://github.com/Nastel/jkool-client-java-api
- Python Streaming API -- https://github.com/Nastel/tnt4py
- Real User Monitoring -- https://github.com/Nastel/jkool-rum-plugin
- Syslog -- https://github.com/Nastel/tnt4j-syslogd
- Log4J -- https://github.com/Nastel/tnt4j-log4j12
- Java Byte Code -- https://github.com/Nastel/tnt4j-streams-zorka