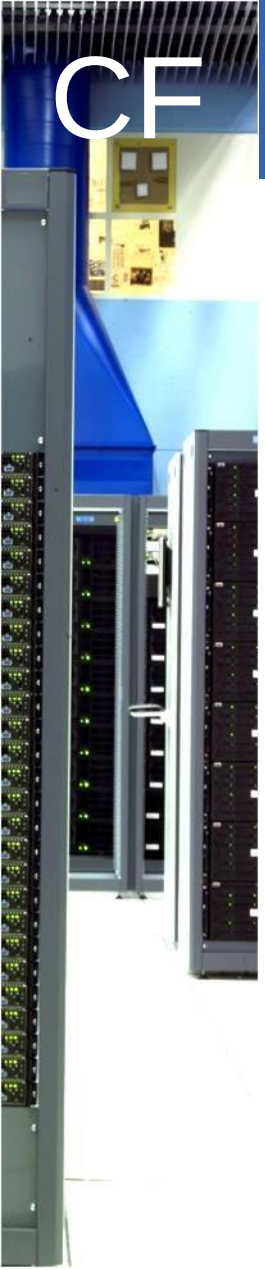

Agile Infrastructure Monitoring

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Context

- Monitoring in IT covers a wide range of resources
  - Hardware, OS, services, applications, files, jobs, etc.
  - Resources have several dependencies between them

- Many application-specific solutions at CERN IT
  - Similar needs and architecture
    - Publish metric results, aggregate results, alarms, etc.
  - Different technologies and tool-chains
    - Some based on commercial solutions
  - Similar limitations and problems
    - Limited sharing of monitoring data

Context

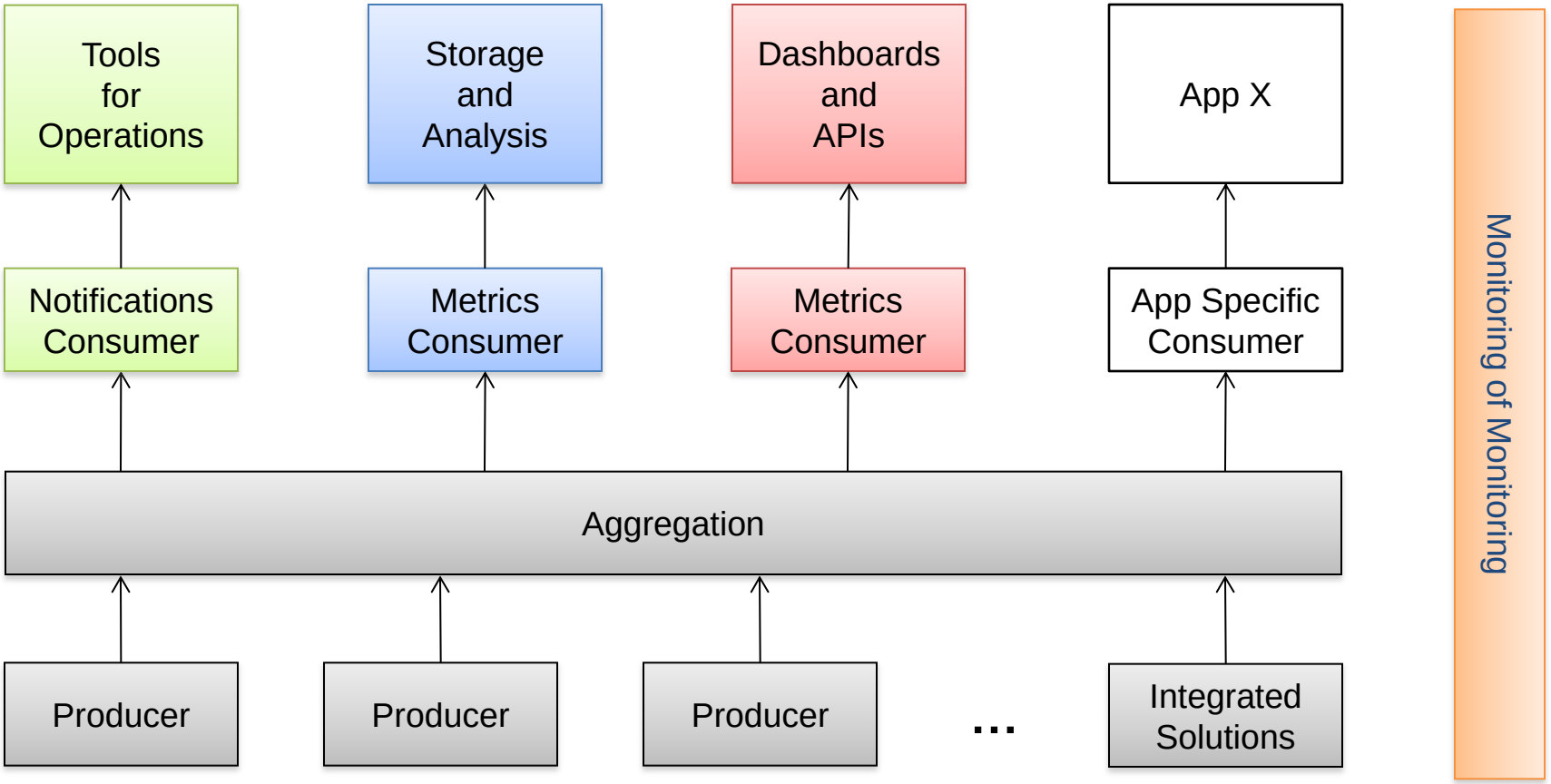
- Several improvements and challenges to address
  - Make monitoring data easy to access
  - Combine and correlate monitoring data
  - Better understand infrastructure/services performance
  - Quick and easy deployment/configuration of dashboards
  - Move to a virtualized and dynamic infrastructure
  - Optimize effort allocated to monitoring tasks

- Need to define a common monitoring strategy!

Strategy and Architecture

- Architecture based on a toolchain approach
  - All components can be easily replaced
- Adopt whenever possible existing technologies
  - mongoDB, logstash, hadoop, kibana, etc.
- Scalability always taken in consideration
  - Horizontally scaling or by adding additional layers
- Messaging infrastructure as key transport layer
  - Messages based on a common format (JSON)
  - Messages based on a minimal specification

Strategy and Architecture



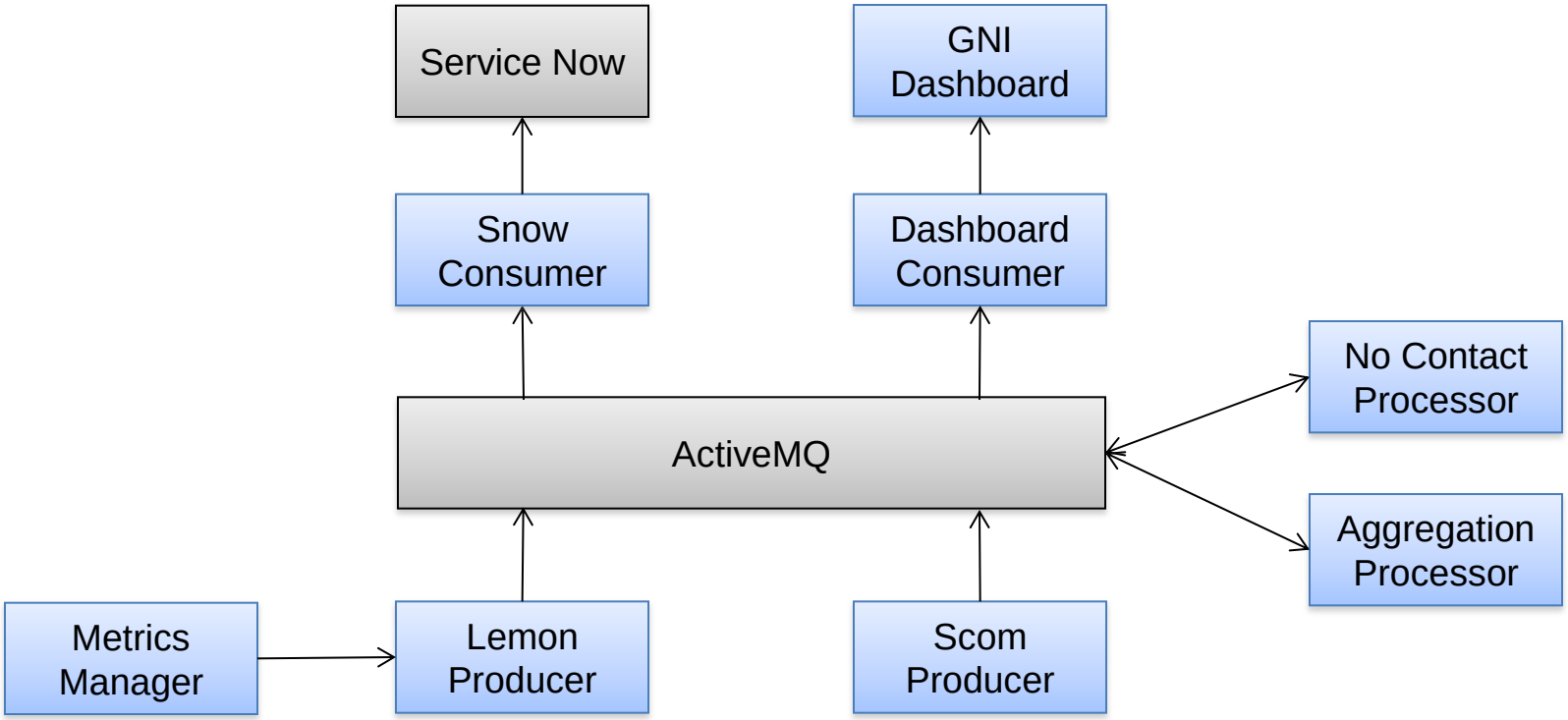
Components provided as **SaaS** and/or **PaaS !**

Tools for Operations

- Scope
  - Real-time delivery of notifications
  - Targeted to appropriate sys admin or service manager
- Model
  - Several producers of notifications publishing to messaging
  - Central gateway for creation of tickets
  - Dashboard for visualization of current notifications
    - Central instance for all notifications
    - Service specific instances for selected notifications

Tools for Operations

- Technologies
  - General Notification Infrastructure (GNI)
  - MongoDB, ActiveMQ, DBoD, Django



Tools for Operations

GNI Dashboard | Browse notifications | b | Info

Refresh

From **now** to **5 days ago**

State : All

Producer : All

Snow : All

Cluster :

=~ regex

castor.*

Add an entity filter

Add a metric filter

Add a generic filter

Show 20 entries

	Created	Cluster	Entities	Metrics	Snow	Links
⊕	2013-04-16 10:47:47	castor/tapeserver	tpsrv680	exception.ipmi_wrong	-	
⊕	2013-04-16 10:47:47	castor/tapeserver	tpsrv680	exception.Operating_System	-	
⊕	2013-04-15 16:36:50	castor/server/diskserver/public…	lxfsrf05c01	exception.high_load	-	
⊖	2013-04-13 02:28:49	castor/server/diskserver/c2rep…	lxfsrk61a03	exception.high_load	-	
	2013-04-13 02:30:49 closed by **lemon** 2013-04-13 02:29:49 updated by **lemon** 2013-04-13 02:28:49 created by **lemon**					
⊕	2013-04-13 01:57:16	castor/server/diskserver/c2rep…	lxfsrk61a01	exception.high_load	-	
⊕	2013-04-13 01:15:16	castor/server/diskserver/c2rep…	lxfsrk61a06	exception.high_load	-	
⊕	2013-04-09 10:02:32	castor/server/diskserver/public…	lxbsp2715	exception.Operating_System	-	
⊕	2013-04-09 10:02:16	castor/server/diskserver/c2rep…	lxfsrk61a01	exception.Operating_System	-	
⊕	2013-04-09 10:02:16	castor/server/diskserver/c2rep…	lxfsrk61a06	exception.Operating_System	-	
⊕	2013-04-09 10:01:49	castor/server/diskserver/c2rep…	lxfsrk61a03	exception.Operating_System	-	
	Created	Cluster	Entities	Metrics	Snow	Links

Showing 10 entries (filtered from 6,042 total)

← Previous 1 Next →

Storage and Analytics

- Scope
  - Store all monitoring data in a common location
  - Allow complex data analytics (cross data sets)
  - Correlate information from distinct data sources
  - Import and store resources metadata (HW, SW, etc.)
  - Archival of monitoring results
  - Recovery of monitoring records
  - Promote sharing of monitoring data and analysis tools
  - Feed the system with processed monitoring data

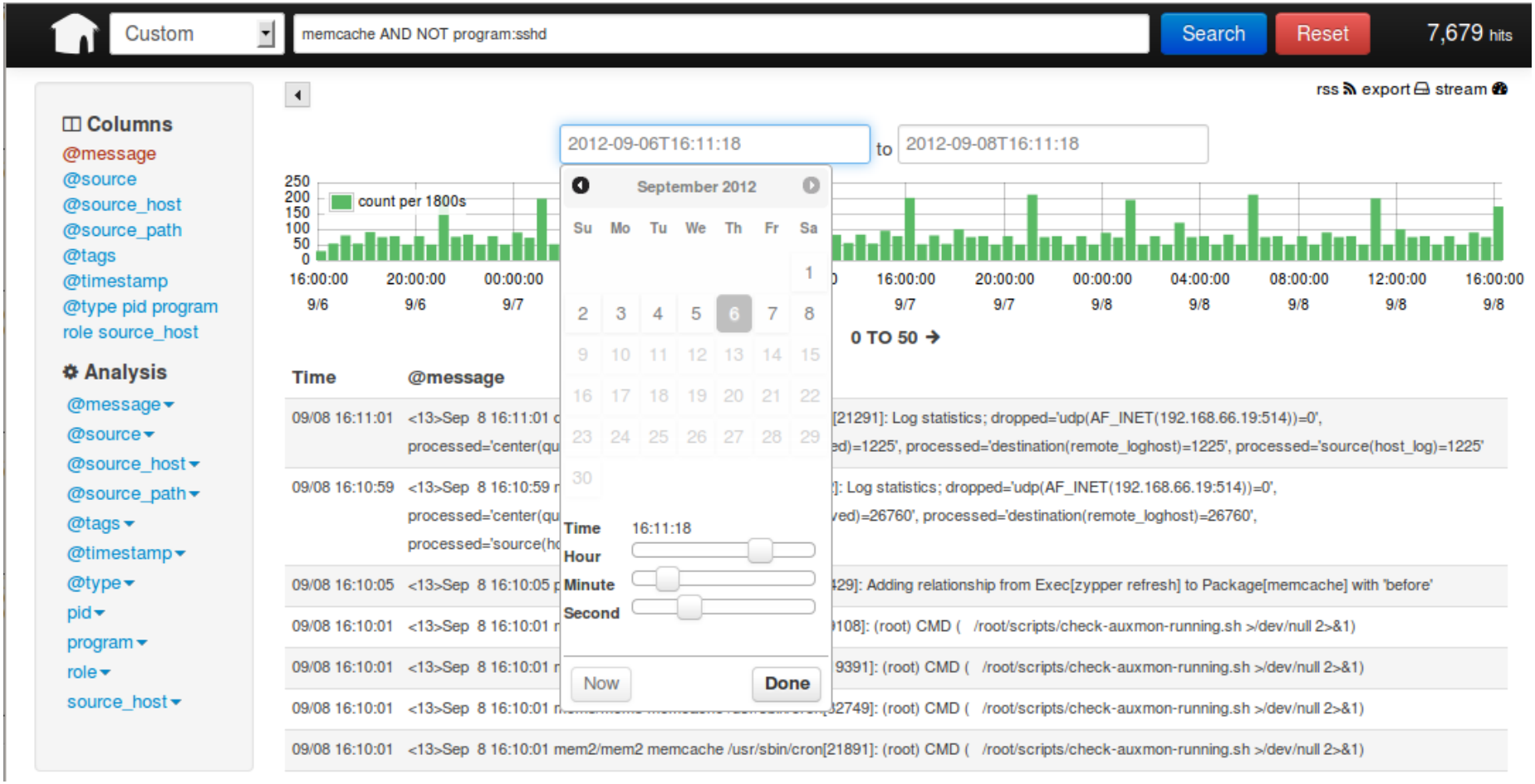
Storage and Analytics

- Model
  - Several producers of metrics publishing to messaging
  - Central service collecting all monitoring data
  - Analytics tasks per applications and IT-wide
- Technologies
  - NoSQL are the most suitable solutions
  - Map-reduce paradigm is a good match
  - Based on IT Hadoop service (CDH)

Dashboards and APIs

- Scope
  - Provide powerful easy to use/deploy dashboards
  - Provide reliable APIs for programmatic access
  - Global views and service-specific views
- Model
  - Several producers of metrics publishing to messaging
  - Central service with high-level dashboards (e.g. SLS)
  - Specific dashboard instances per service/host/metric/etc.
- Technologies
  - Tests with Splunk and Logstash+Elasticsearch+Kibana

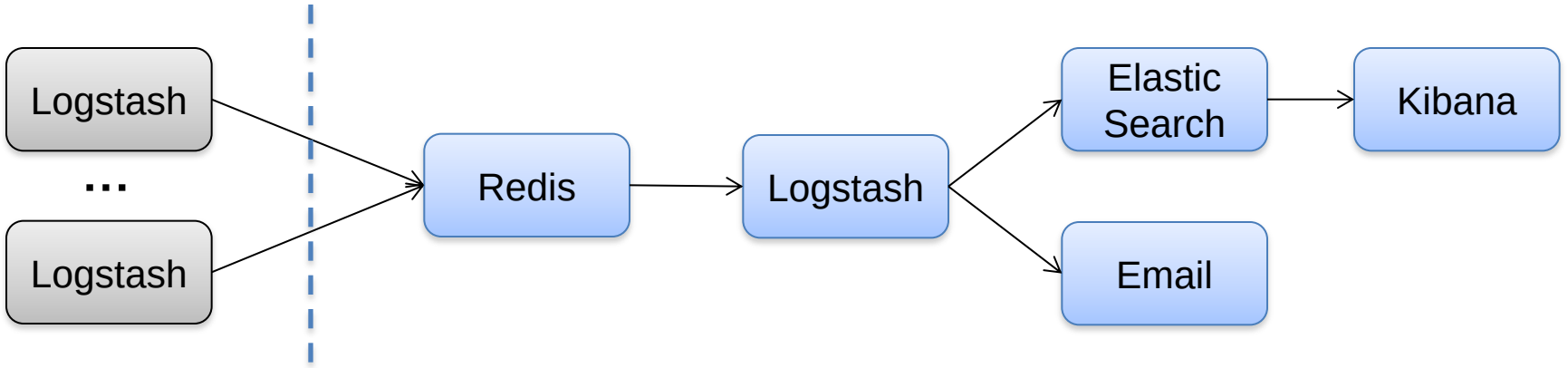
Dashboards and APIs



Monitoring of Monitoring

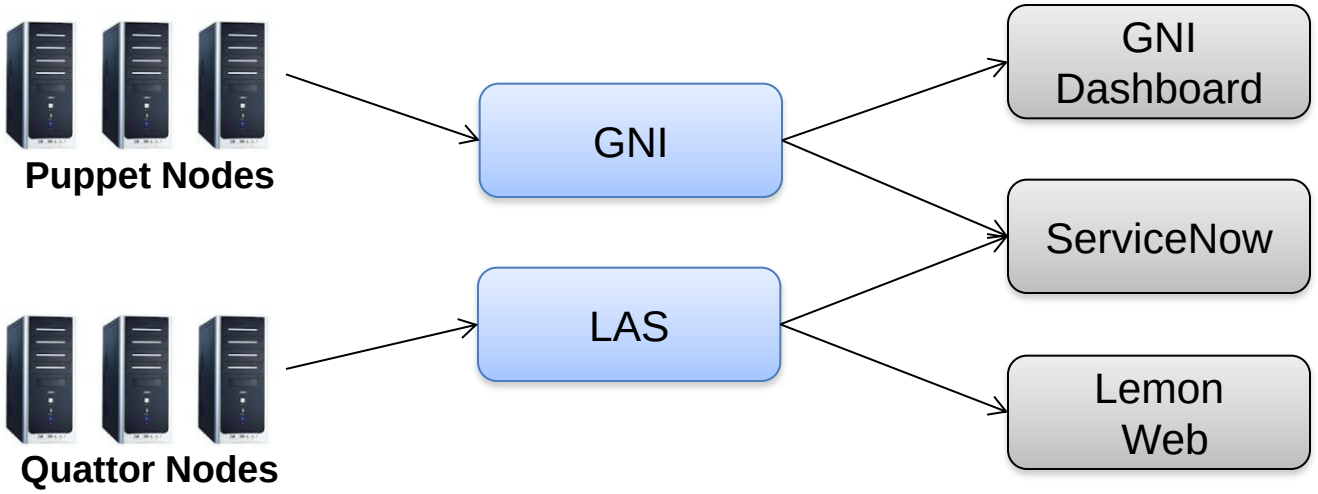
- Scope
  - Provide reliable monitoring of monitoring tools
  - Using as much as possible same tools
  - But avoid using same monitoring instances

- Technologies (for GNI only)



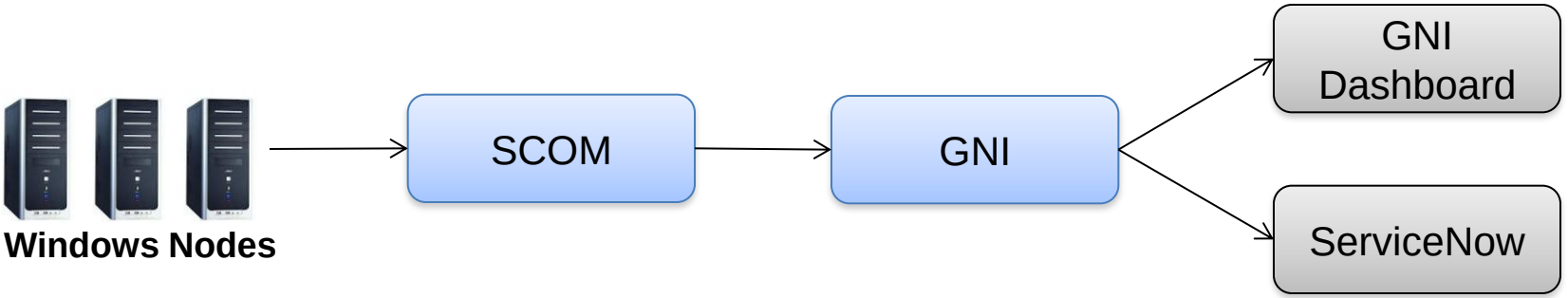
Examples

- Monitoring of linux nodes
  - Producers:
    - Based on existing Lemon agents and sensors
    - Lemon producer forwarding data to messaging
  - Consumers:
    - Notifications handled by GNI consumers



Examples

- Monitoring of windows nodes
  - Producers:
    - Based on SCOM (system centre operations manager)
    - SCOM integrates data from all windows nodes
  - Consumers:
    - Notifications handled by GNI consumers



Examples

- Monitoring of Castor service
  - Good example of architecture adoption by one service
    - More details in Massimo's talk (tomorrow PM)
  - Producers
    - Castor producer sending castor logs to messaging
  - Consumers
    - Metrics stored in Hadoop for archive and analytics
    - Other castor specific tools: MAE, Cockpit, LogViewer
      - But also interesting for other services!

Future Plans

- Get more data… more producers
  - Number of hosts monitored by new lemon producer
  - Number of producers from new applications
- Test and improve monitoring operational tools
  - Improve operational procedures
  - Get feedback from sys admin and service managers
  - Test monitoring of Wigner resources
- Continue implementation of analytics tools
  - Data in Hadoop to allow users to run analytics tasks
  - Provide and test configurable dashboards instances

Summary

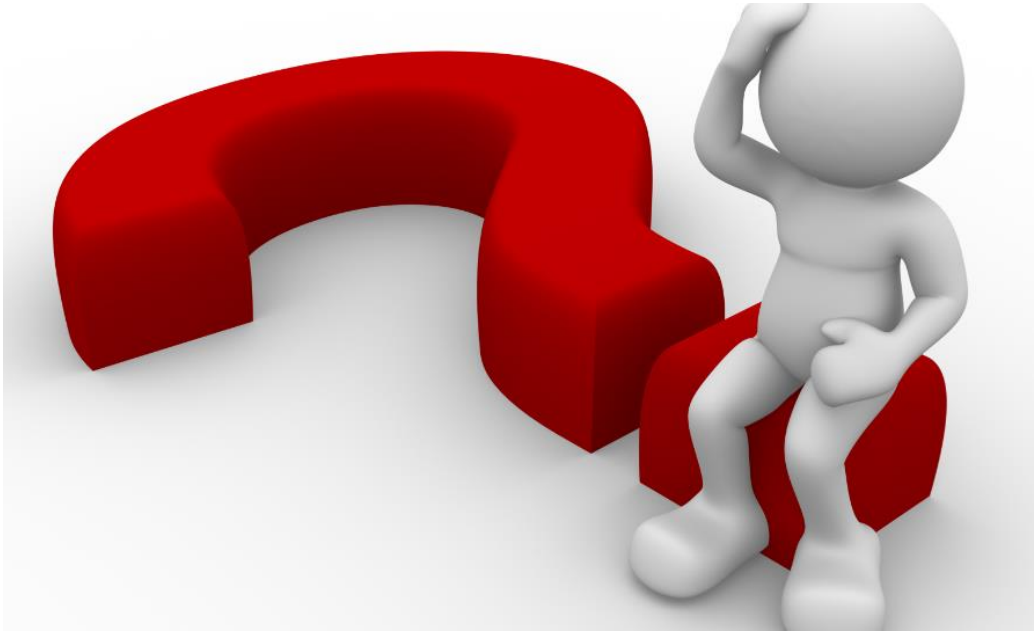
New monitoring strategy and architecture defined

Preproduction system for notifications in place

Implementation ongoing for monitoring data analytics and dashboards

Thank you!

Thank the contribution of all members of
CERN IT Agile Monitoring Team to this work !



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