Monitoring in Multi-Clouds

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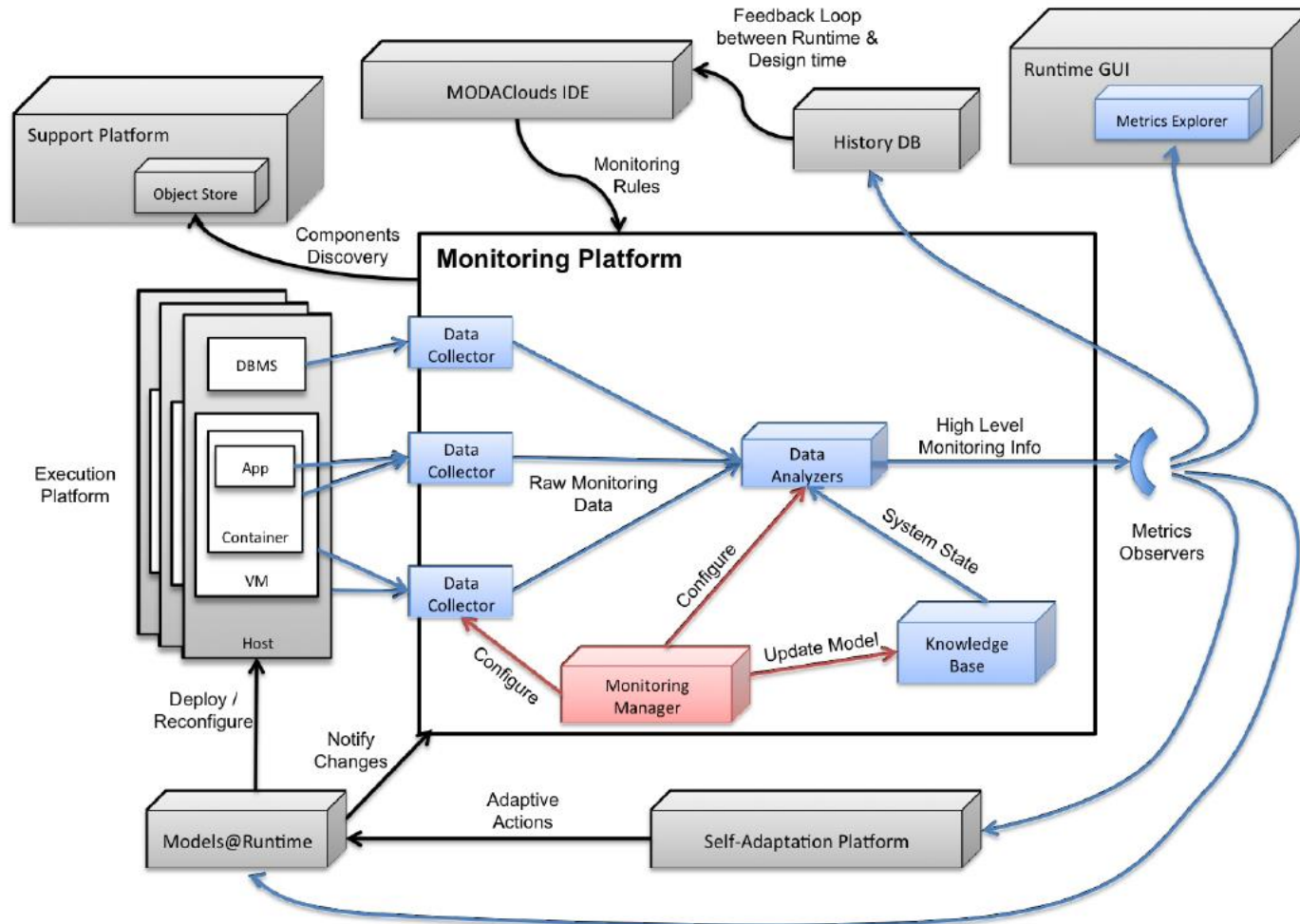West University of Timisoara, Romania, Europe

Model-Driven Approach for design and execution of applications on multiple Clouds

QoS monitoring

www.modaclouds.eu

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MODAClouds Monitoring Platform Architecture

D6.3.2 deliverable (open access) on project site, including the links to open-source software

Monitoring metrics

- Infrastructure level monitoring metrics (host, VM)
  - General
    - CPUUtil, DiskReadBytes, NetworkInBytes, ContextSwitch, Interrupts, MaxProcs, MemUsed etc
  - Cloud provider specific
    - Eg Amazon: NetworkInOut, DiskReadOps etc
- JVM container level metrics
  - PeakThreadCount, HeapMemoryUsed, Uptime etc
- Application level metrics
  - General
    - UserID, Timestamps, HTTPStatusCode, ObjectSize, UserAgent, RequestFlag, RequestAction, Referer etc
  - MySQL
    - Uptime, Threads_running, Threads_cached, Threads_create,Threads_connected, Bytes_receved, Connections etc

Data colectors and analyzers

Data colectors

▸ JMX data collector
▸ Collectl data collector
▸ Sigar data collector
▸ Log file parser
▸ MySQL data collector
▸ Amazon EC2 CloudWatch collector
▸ Flexiant Cloud monitor
▸ EC2 spot price monitor
▸ Start-up time monitor
▸ Cost monitor
▸ Detailed cost monitor
▸ Availability/Reliability monitor

Data analyzers

▸ Deterministic (DDA)
▸ Statistic (SDA)
  ▸ Estimation SDAs, e.g.
    ▸ Utilization-based optimization
    ▸ Utilization-based regression
  ▸ Forecasting SDAs
    ▸ Time series, e.g.
      ☐ Auroregressive model
    ▸ Machine learning, e.g.
      ☐ Linear regression
  ▸ Correlation SDAs
    ▸ Machine learning, e.g.
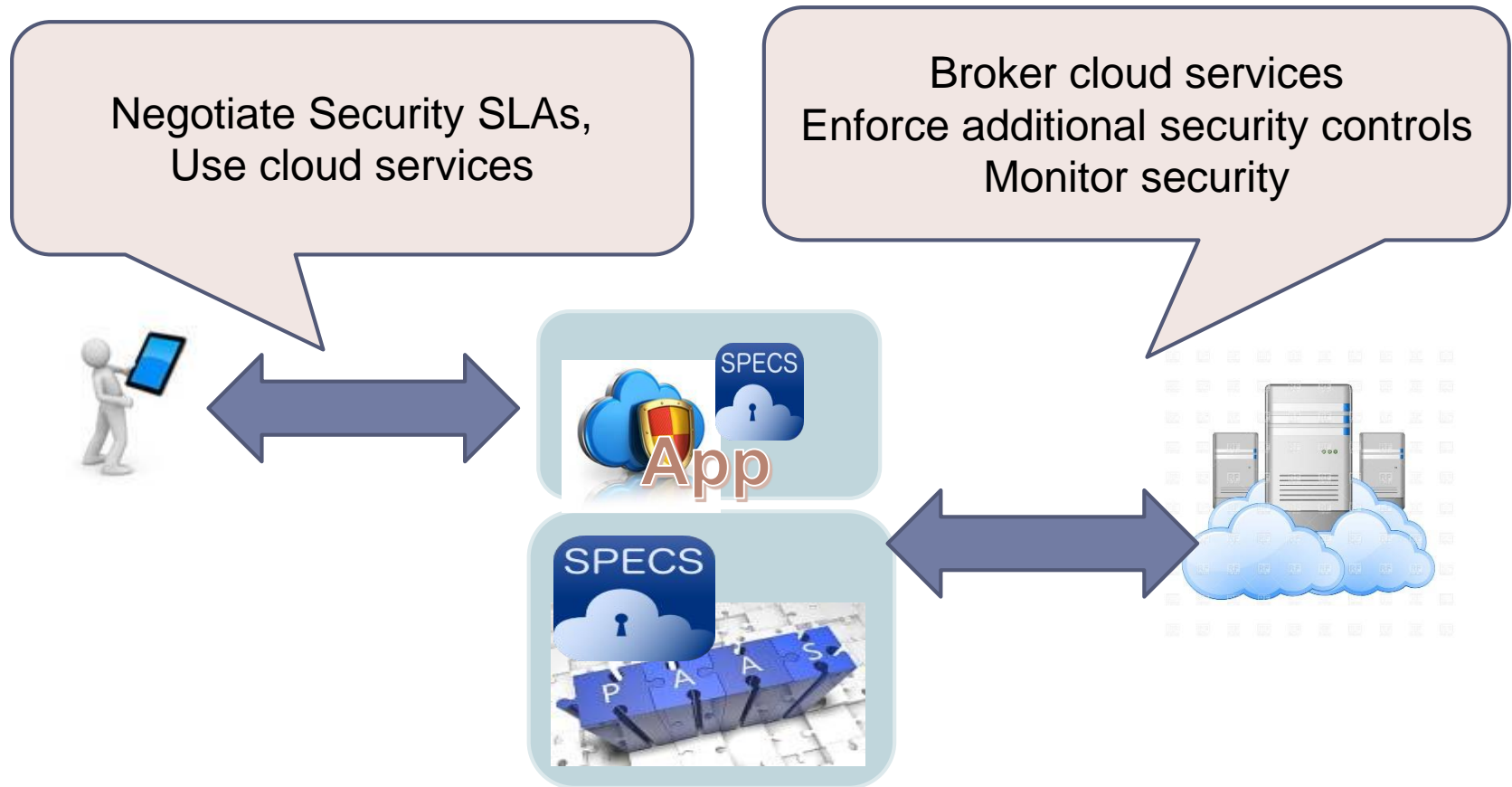   ☐ Naive Bayes

Secure Provisioning of Cloud Services based on SLA Management
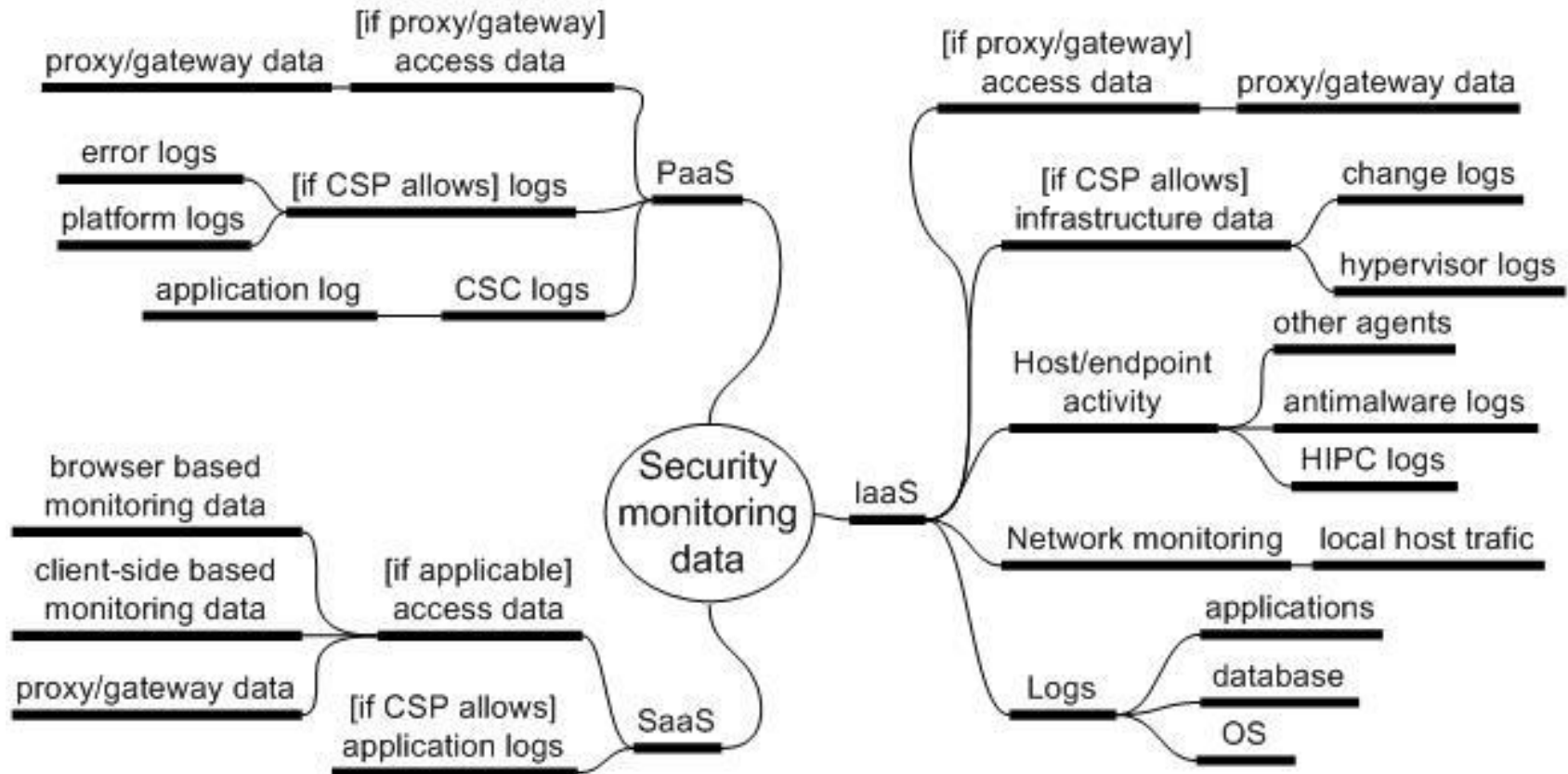
SLA-based Cloud security monitoring

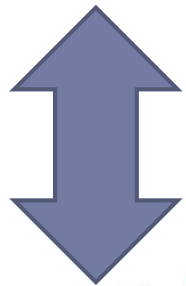www.specs-project.eu

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SPECS Working Model

Negotiate Security SLAs,
Use cloud services

Broker cloud services
Enforce additional security controls
Monitor security

SPECS

App

SPECS

Short video presentation:
https://youtu.be/laY98UKzqQU

Security monitoring data

SPECS PaaS

App

End User

NEGOTIATION

RE - NEGOTIATION

Negotiation Module

Monitoring Module

IMPLEMENTATION

REMEDIATION

REDRESSING

MONITORING

Monitoring Event?

Diagnosis & Detection

Enforcement Module

SLA Platform

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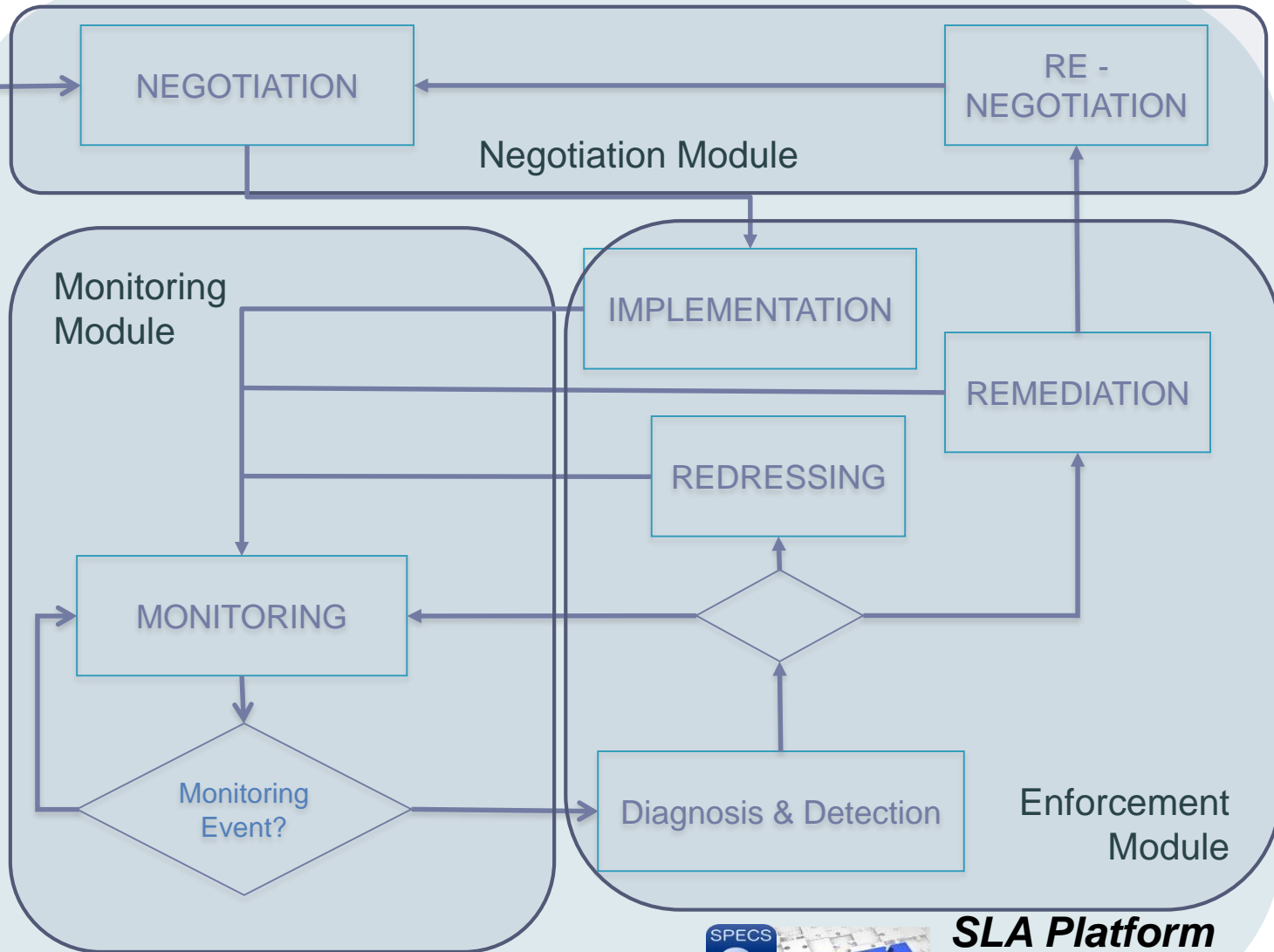
SPECS Framework
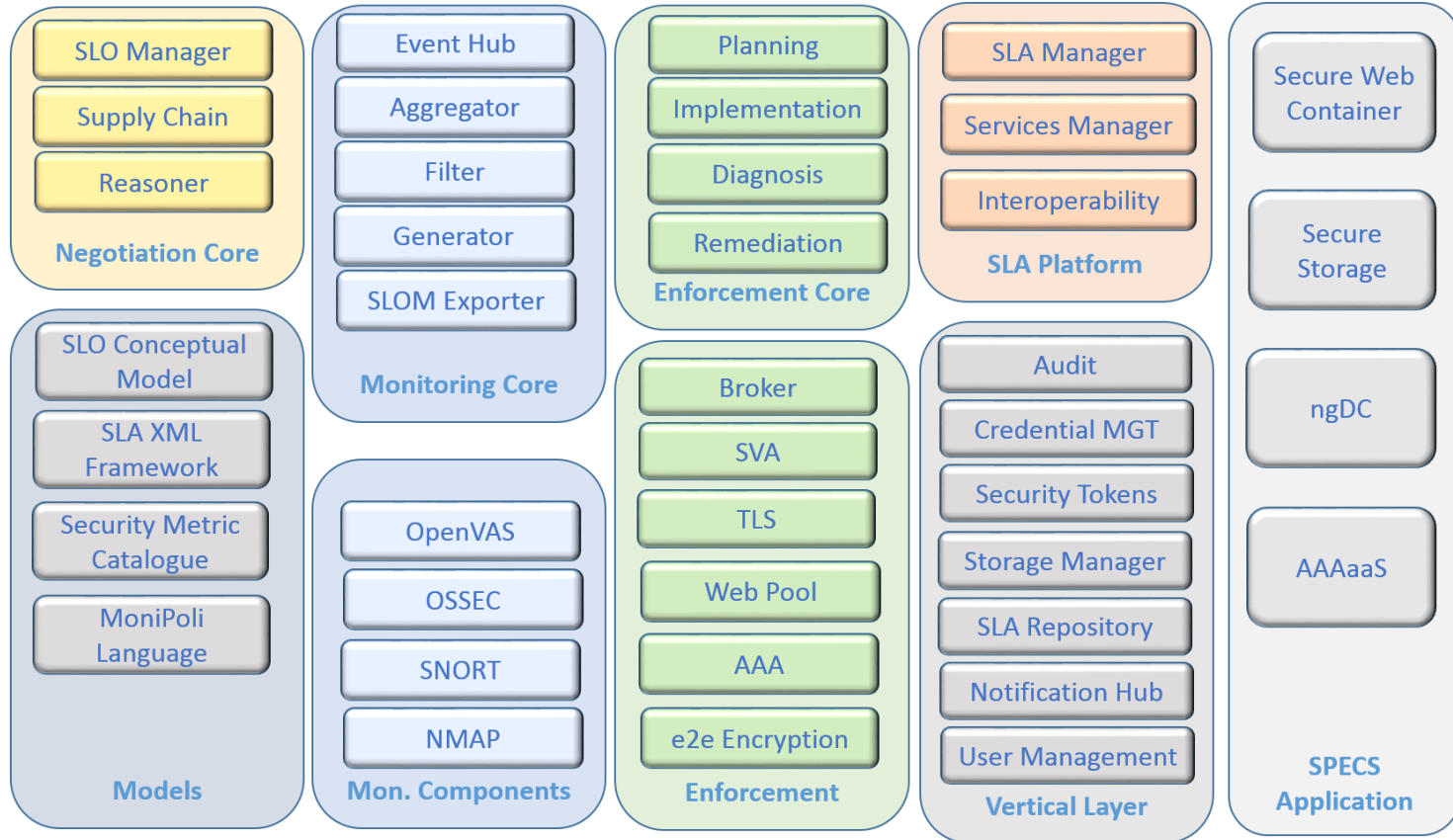
For developers

- https://youtu.be/_Y-czdAFGwk
- Open source codes at: https://bitbucket.org/specs-team/

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DICE

Developing Data-Intensive Cloud Applications
with Iterative Quality Enhancements

Monitoring Big-Data frameworks

www.dice-h2020.eu

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What is monitored?

1. Frameworks
   - Hadoop: HDFS, YARN, Spark
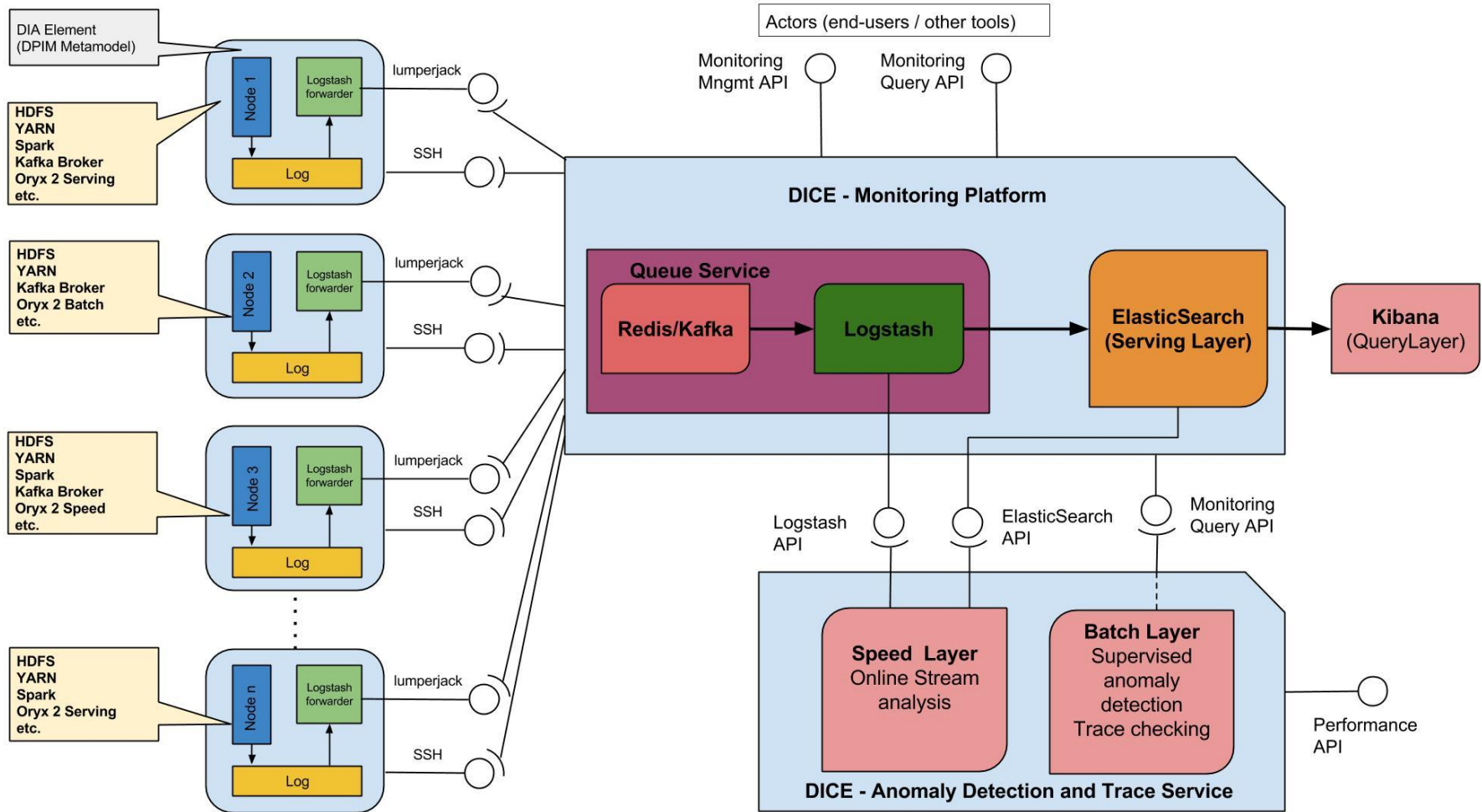   - Kafka
   - Storm
   - NoSQL: couchdb, cassandra
2. Metrics
   - performance
   - platform status
3. E.g. Hadoop
   - 260 metrics

D-Mon – a scalable framework

Open problems

‣ Match between high level requirements and low level metrics

‣ Metrics independence from the Cloud provider and metrics standardization

‣ Anomaly detection mechanisms