6th Annual IT Security Automation Conference and Expo
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Security Automation for the Cloud

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Senior Technology Strategist
RSA Security

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The Security Division of EMC

Cloud Computing Security: What's more difficult?

- Deeper technology stack
- More intimate sharing of resources
- More dynamic hosting
- Multi-Tenancy (Multi-department (-cy?))
- Composition of services; xCloud
- Composition of partners, supply chain, … trust network
- Homogeneity – cartography, advanced threats, …

Cloud Computing Security: The threat

- Advanced threats targeting cloud infrastructure and endpoints
- Discovery/mapping of workload to host binding for malware co-location
- Side channels through shared resources
- Isolation threats - firmware, glue chips, BIOS, …
- Authentication - blended roles, federation
- Information security - protection, availability, privacy

Cloud Computing Security: What can work better?

- Community sourced insight – content to efficacy
- Provisioning flexibility
- Service leveraging (mail filtering, information scanning, storage options (repl), security services)
- Hosting dynamics (mid term)
  - Periodic re-provisioning
  - Periodic re-hosting
  - Control mechanism rotation

Standards have more benefit in the Cloud

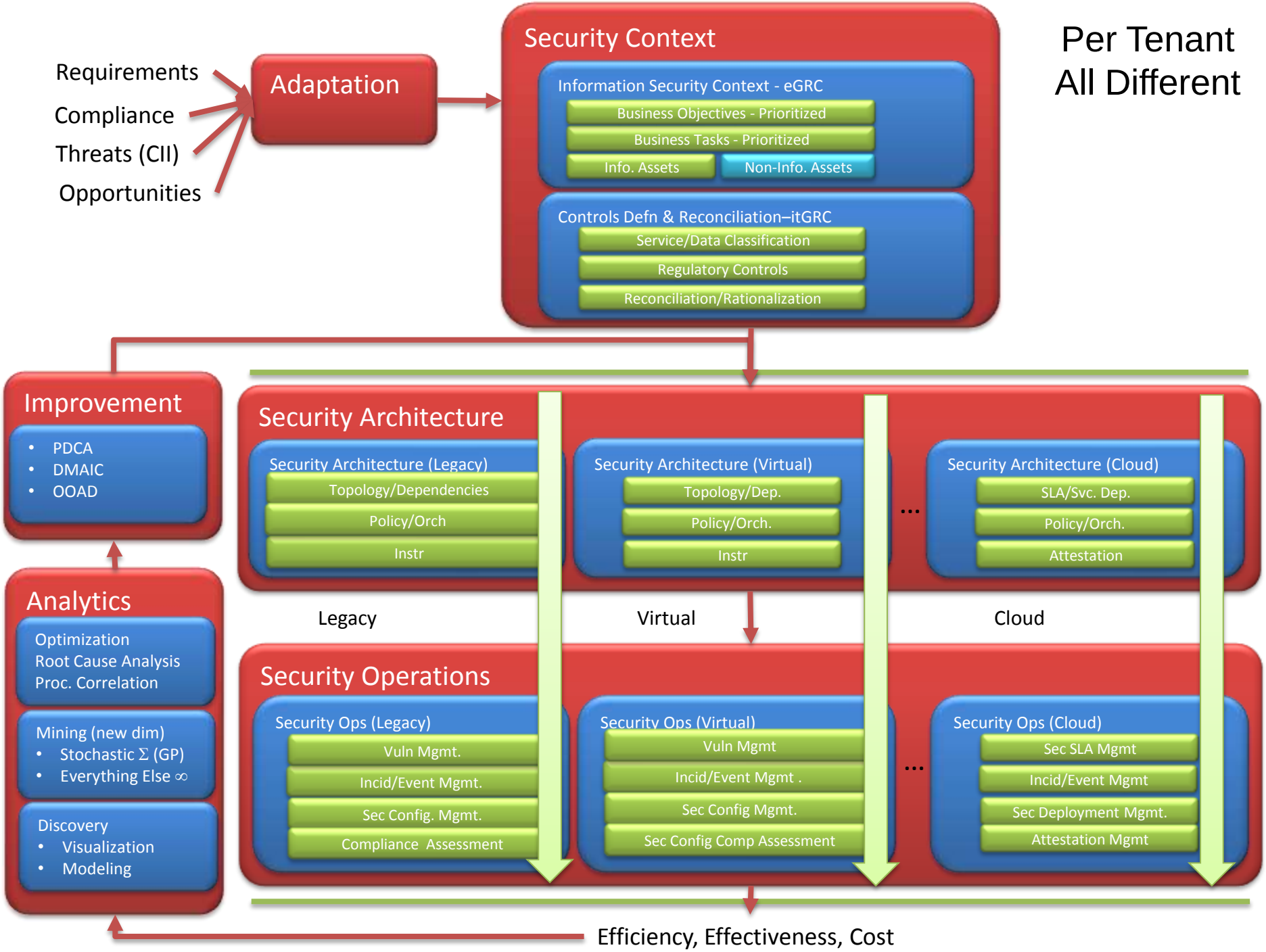
- Reduce ambiguity
- Normalize vocabulary
- Cloud source guidance - guidance
- Close the loop – measurement, effectiveness
- Share empirical feedback
- Community broader situation awareness
- ….

Automation: The Goal

- Automation doesn’t happen for it’s own sake:
- Objectives (increasing):
  - Efficiency - work per unit time
  - Efficacy - confirmation of result
  - Alignment - appropriate coherence
  - Improvement - refinement
  - Agility – alternatives
- But … Automation can create inertial mass (scripts)

Good Automation

- Automation -> Efficiency
- += Feedback -> Alignment
- += Measurement -> Improvement
- += Analytics -> Agility


Per Tenant
All Different
Requirements
Compliance
Threats (CII)
Opportunities
Adaptation
Security Context
Information Security Context - eGRC
Business Objectives - Prioritized
Business Tasks - Prioritized
Info. Assets
Non-Info. Assets
Controls Defn & Reconciliation–itGRC
Service/Data Classification
Regulatory Controls
Reconciliation/Rationalization
Improvement
PDCA
DMAIC
OOAD
Analytics
Optimization
Root Cause Analysis
Proc. Correlation
Mining (new dim)
Stochastic Σ (GP)
Everything Else ∞
Discovery
Visualization
Modeling
Security Architecture
Security Architecture (Legacy)
Topology/Dependencies
Policy/Orch
Instr
Security Architecture (Virtual)
Topology/Dep.
Policy/Orch.
Instr
...
Security Architecture (Cloud)
SLA/Svc. Dep.
Policy/Orch.
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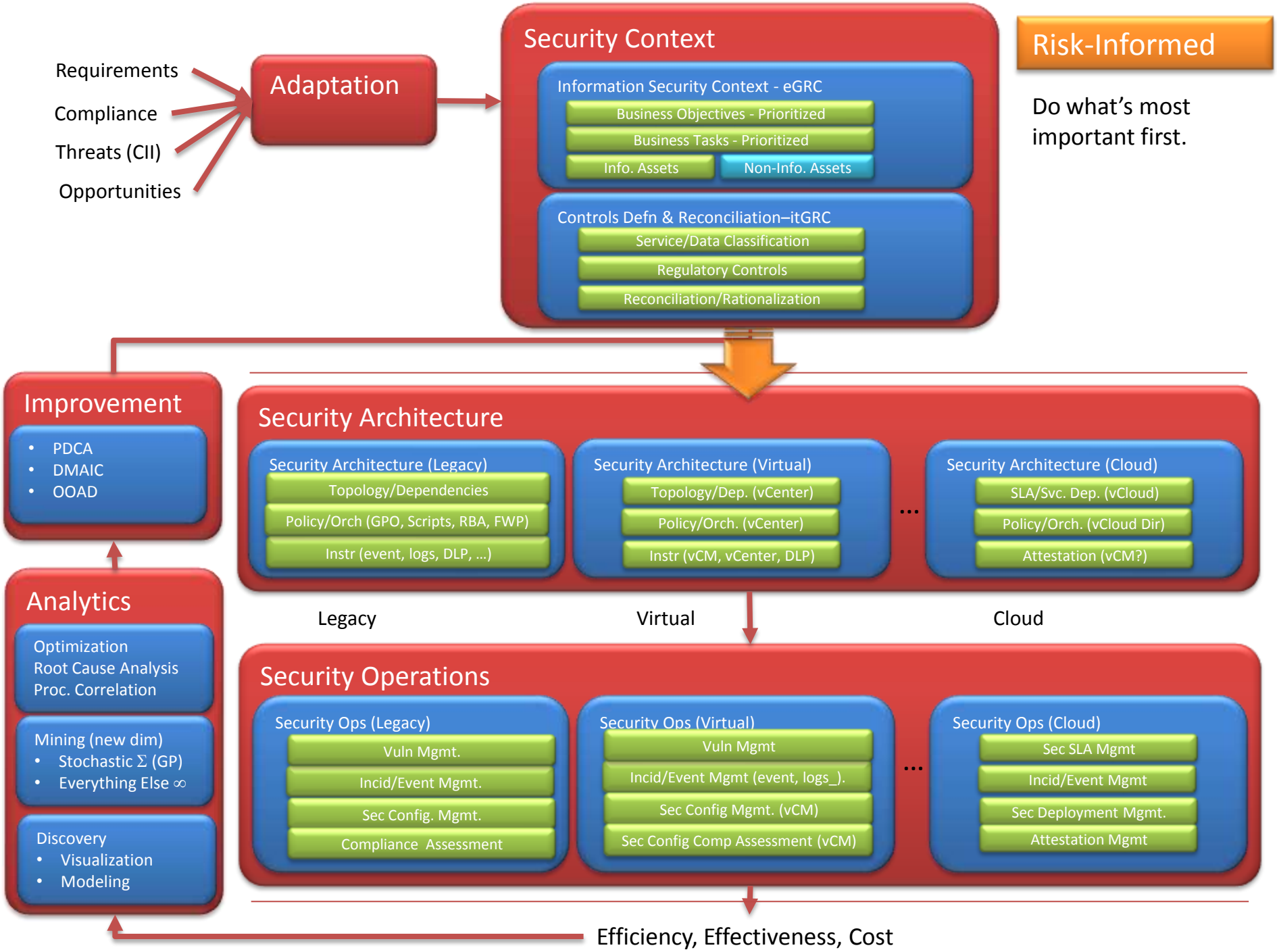
Sec Deployment Mgmt.
Attestation Mgmt
Efficiency, Effectiveness, Cost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Risk-Informed
Do what's most important first.
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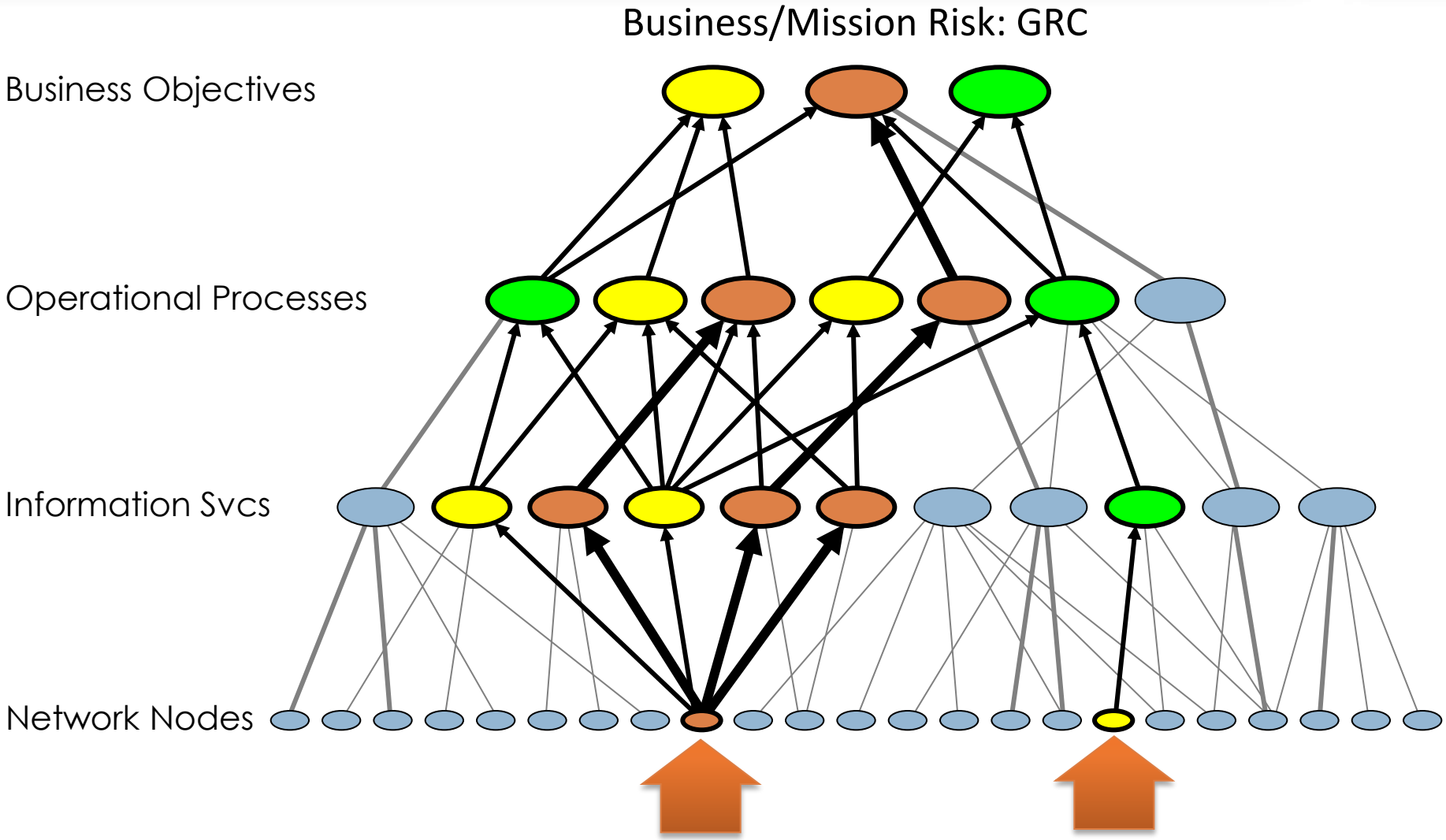
RISK CONTEXT



Automated Content: CVE, CVSS, CWE

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Virtualization => More Coupling

Services

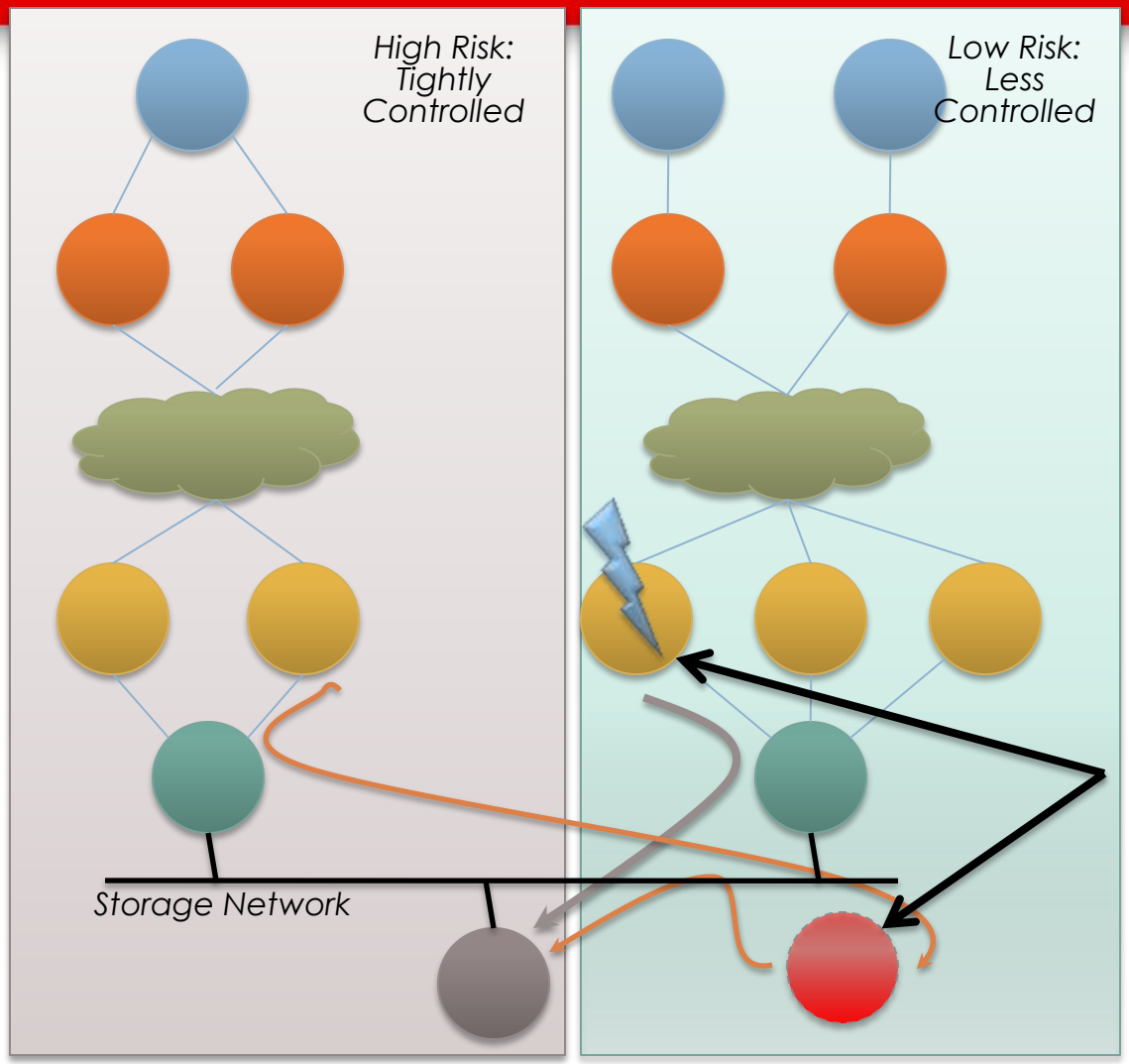
Applications

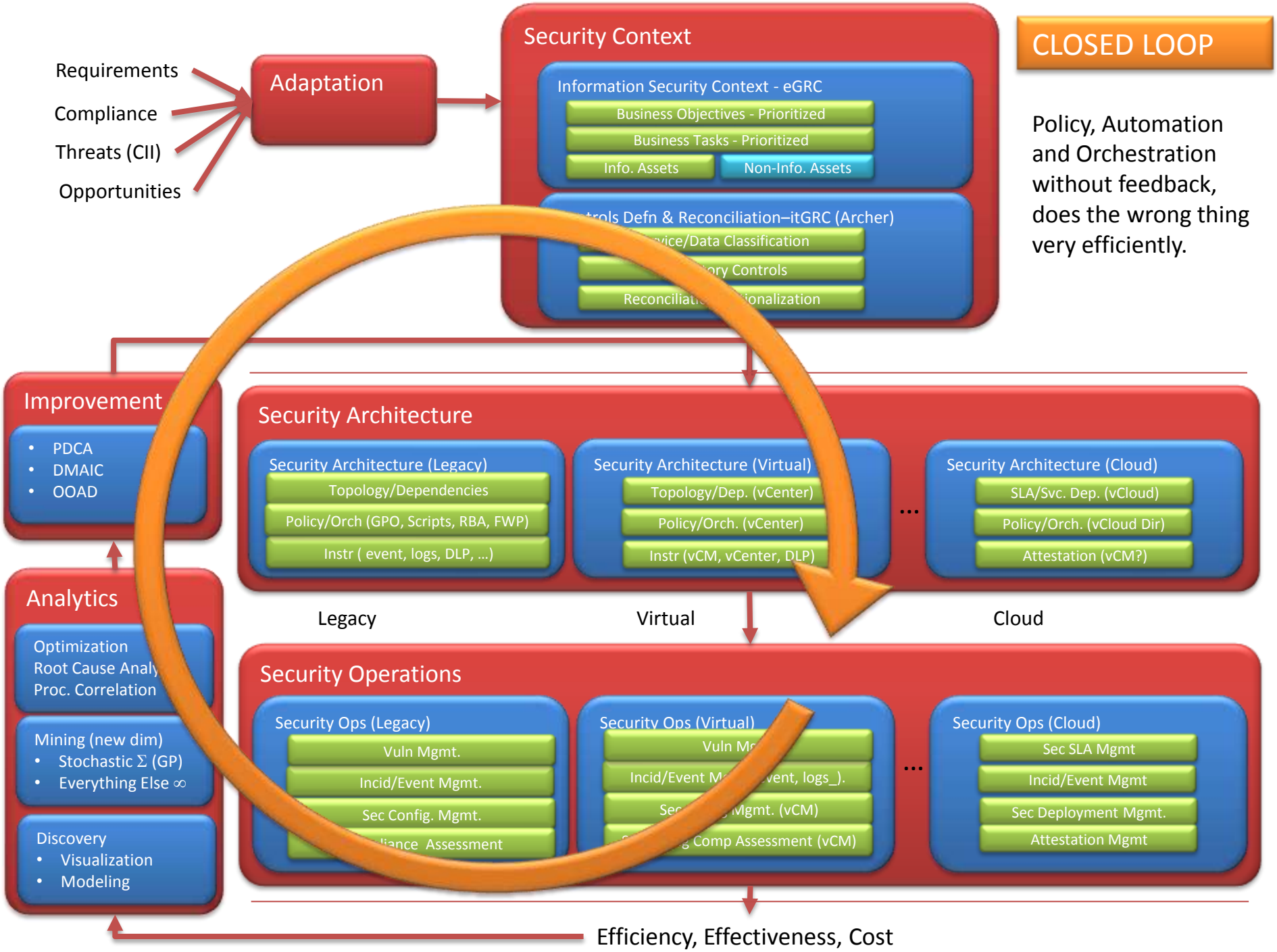
Network Virtualization

Virtualized Guests

Virtualization Hosts

SAN - Storage Virtualization

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Defn & Reconciliation–itGRC (Archer)
Data Classification
Controls
Reconciliation
CLOSED LOOP
Policy, Automation and Orchestration without feedback, does the wrong thing very efficiently.
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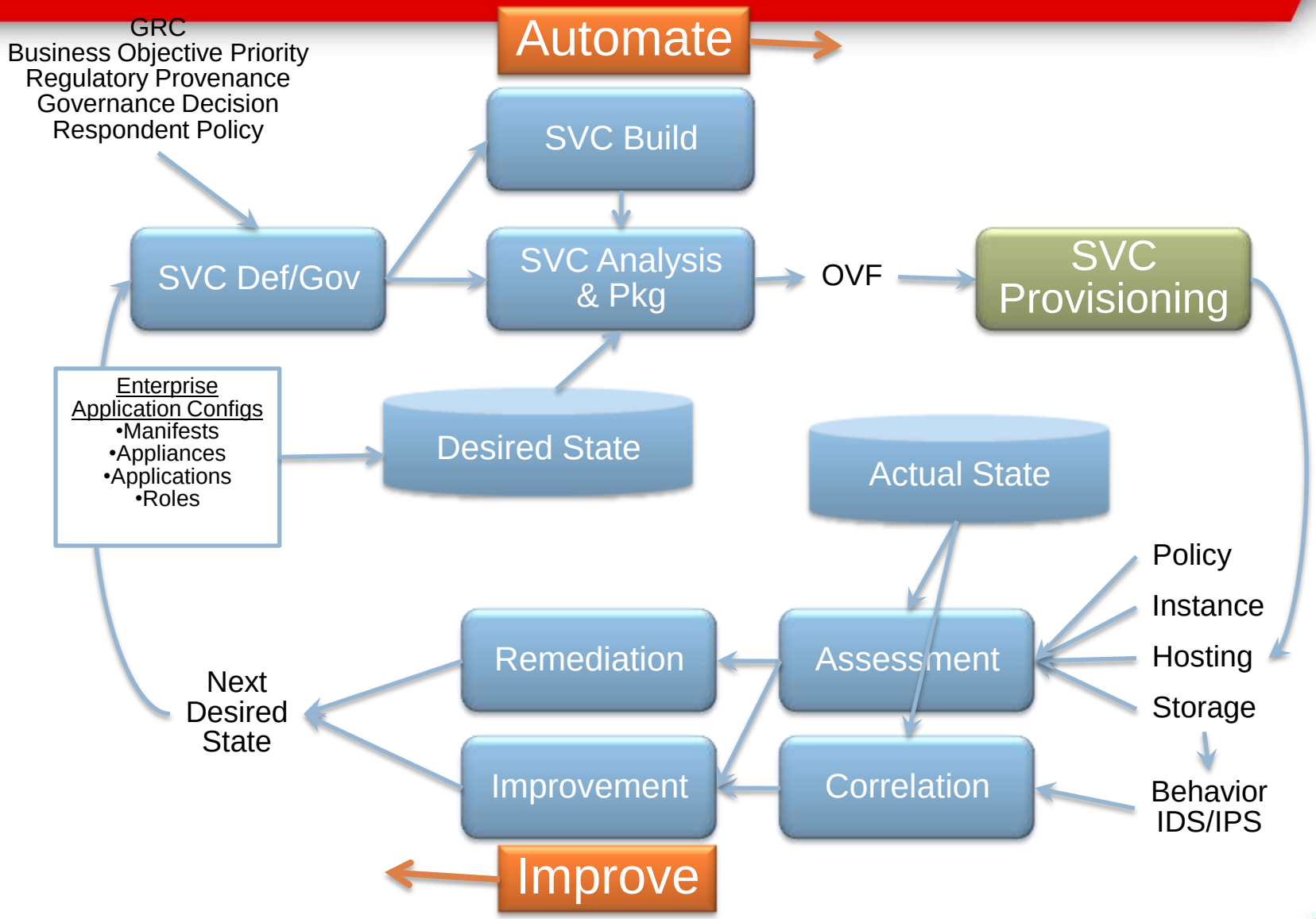
Efficiency, Effectiveness, Cost

Operations Cycle



Automated Content: OVAL, CVE, CVSS, CWE, …

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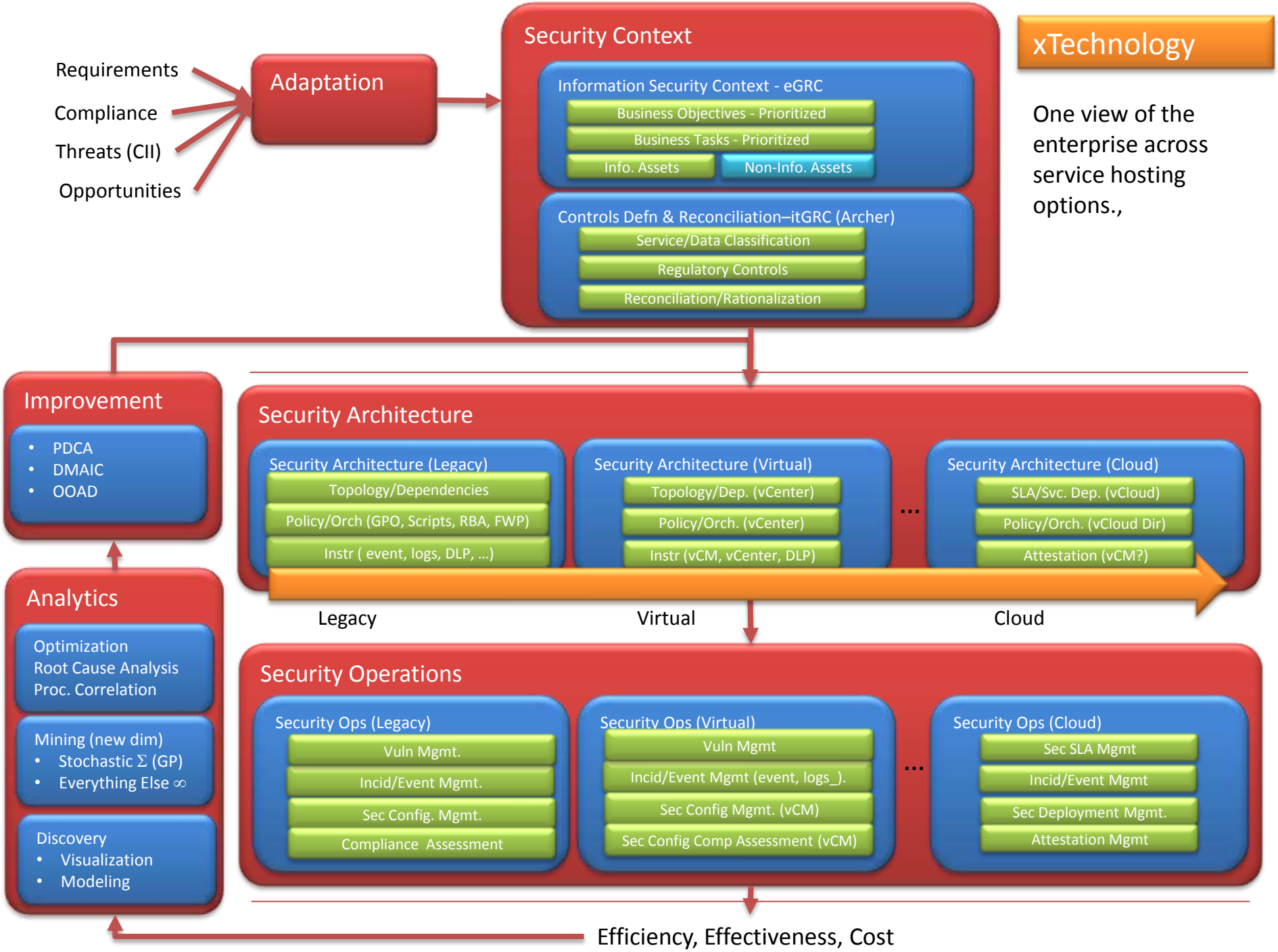
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Regulatory Controls
Reconciliation/Rationalization
xTechnology
One view of the enterprise across service hosting options.,
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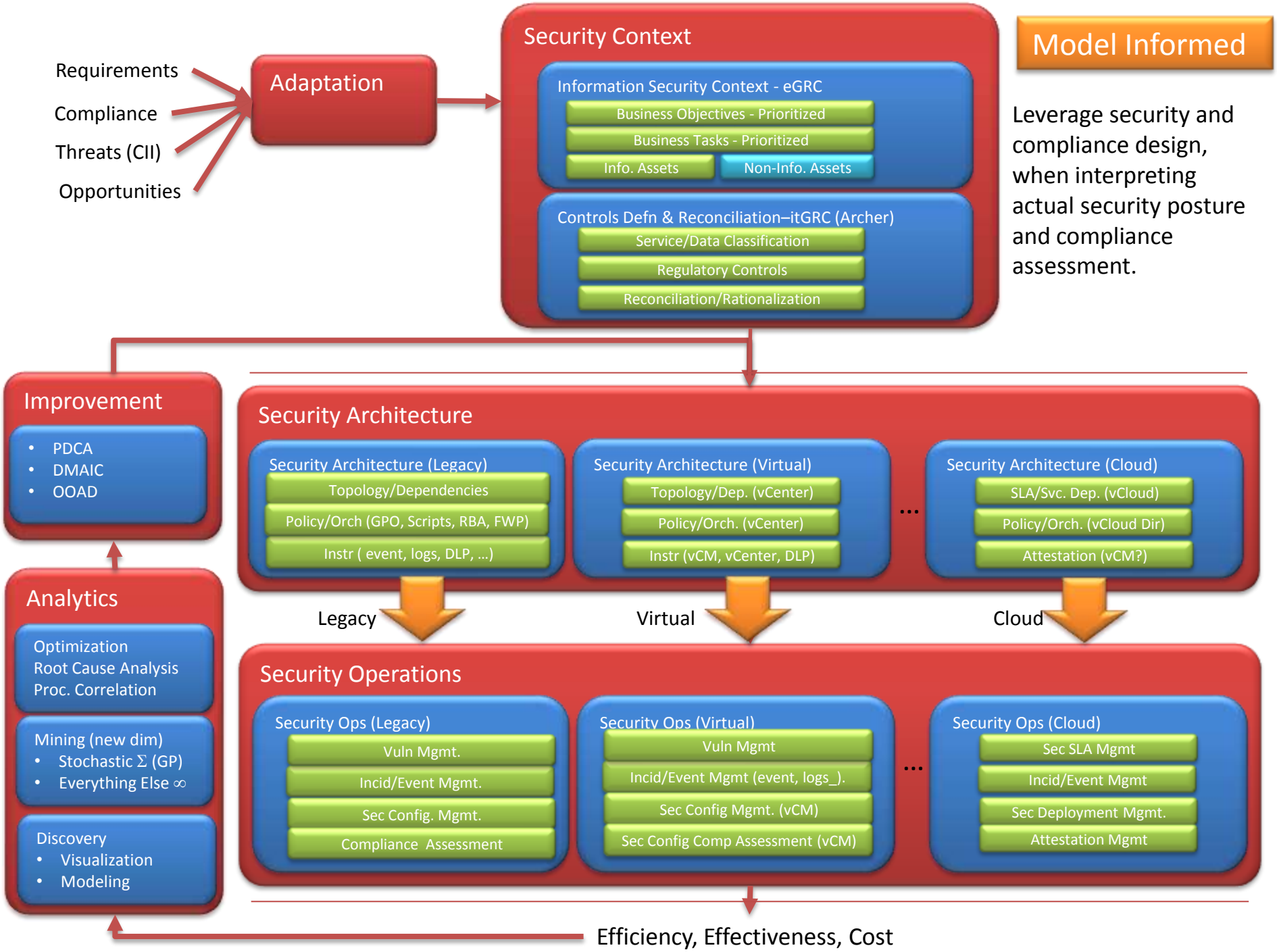
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Reconciliation/Rationalization
Model Informed
Leverage security and compliance design, when interpreting actual security posture and compliance assessment.
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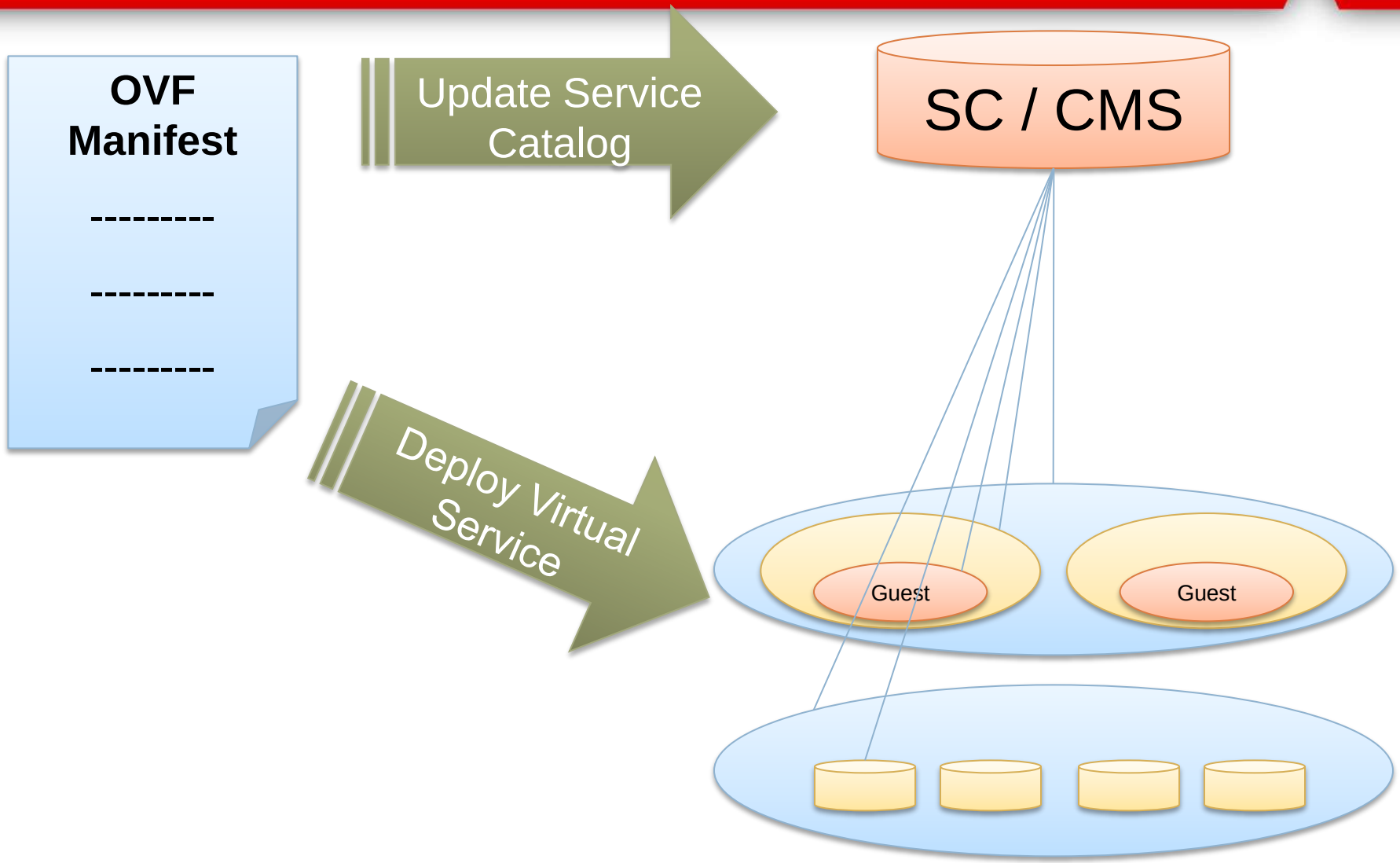
Efficiency, Effectiveness, Cost

Service Model: OVF



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Service Model: OVF

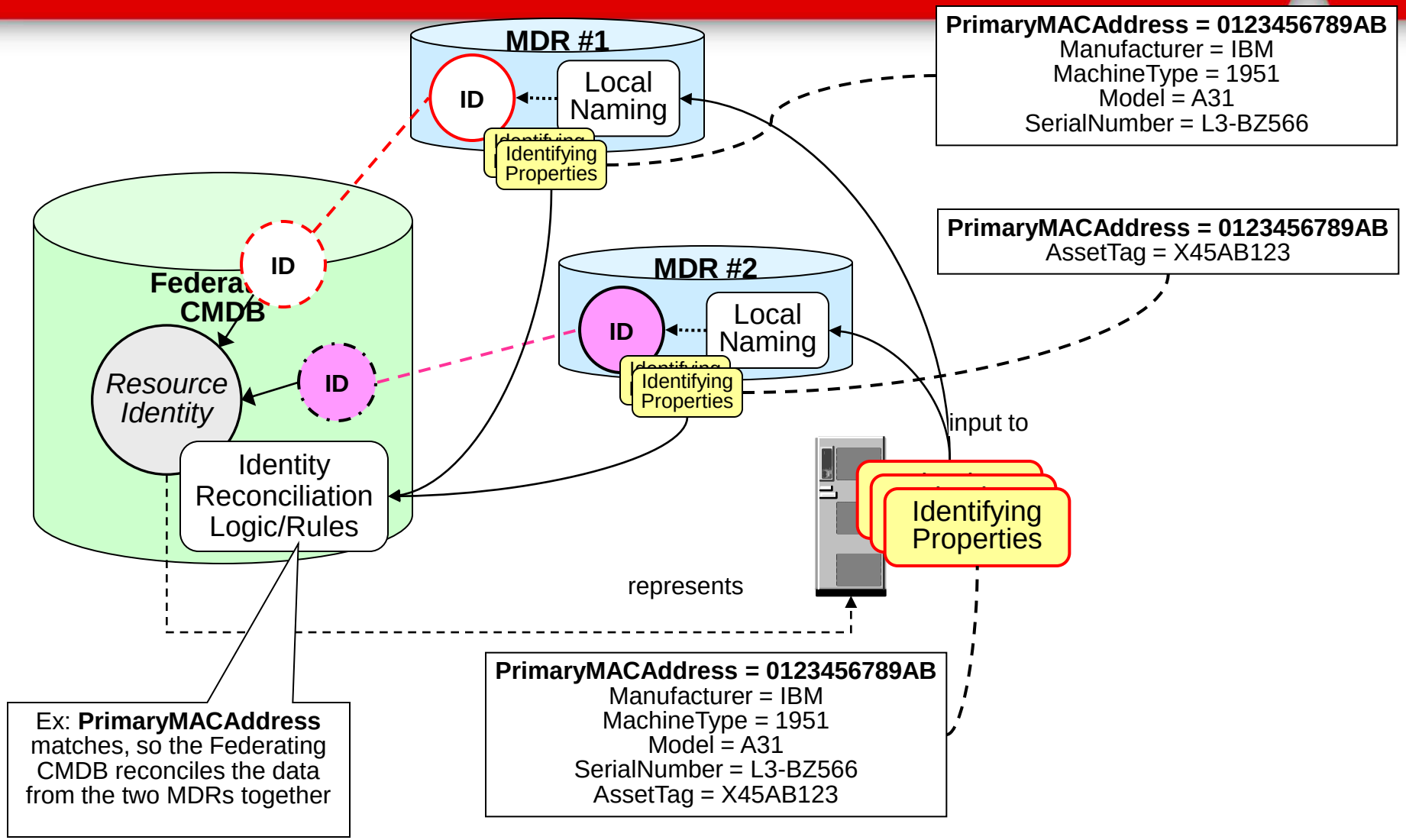
App Server

DB Server

```
</ProductSection>
- <StartupSection>
  <Info>Startup order of the virtual machines</Info>
  <Item ovf:id="DBServer" ovf:order="1" ovf:startDelay="120" ovf:startAction="powerOn" ovf:waitingForGuest="true"
  <Item ovf:id="AppServer" ovf:order="2" ovf:startDelay="120" ovf:startAction="powerOn" ovf:waitingForGuest="true"
  </StartupSection>

- <VirtualSystem ovf:id="AppServer">
  <Info>The configuration of the AppServer virtual m
  <Name>Application Server</Name>
- <!-- Linux component configuration parameters   -->
- <ProductSection ovf:class="org.linuxdist.x">
  <Info>Product customization for the installed Linu
  <Product>Linux Distribution X</Product>
  <Version>2.6.3</Version>
  <Property ovf:key="hostname" ovf:type="string" ovf
  <Property ovf:key="ip" ovf:type="string" ovf:value="$
  <Property ovf:key="subnet" ovf:type="string" ovf:val
…
  </ProductSection>
- <OperatingSystemSection ovf:id="36">
  <Info>Guest Operating System</Info>
  <Description>Linux 2.6.x</Description>
  </OperatingSystemSection>
- <VirtualHardwareSection>
  <Info>Virtual Hardware Requirements: 256 MB, 1 (
…
- <Item>
  <rasd:Description>Number of virtual CPUs</rasd:D
  <rasd:ElementName>1 virtual CPU</rasd:ElementN
…
```

```
- <VirtualSystem ovf:id="DBServer">
  <Info>The configuration of the database virtual machine</Info>
  <Name>Database Server</Name>
- <!-- Linux component configuration parameters   -->
- <ProductSection ovf:class="org.linuxdist.x">
  <Info>Product customization for the installed Linux system</Info>
  <Product>Linux Distribution X</Product>
  <Version>2.6.3</Version>
  <Property ovf:key="hostname" ovf:type="string" ovf:value="${dbHostname}" />
  <Property ovf:key="ip" ovf:type="string" ovf:value="${dbIp}" />
  <Property ovf:key="subnet" ovf:type="string" ovf:value="${subnet}" />
…
  </ProductSection>
- <OperatingSystemSection ovf:id="36">
  <Info>Guest Operating System</Info>
  <Description>Linux 2.6.x</Description>
  </OperatingSystemSection>
- <VirtualHardwareSection>
  <Info>Virtual Hardware Requirements: 256 MB, 1 CPU, 1 disk, 1 nic</Info>
…
- <Item>
  <rasd:Description>Number of virtual CPUs</rasd:Description>
  <rasd:ElementName>1 virtual CPU</rasd:ElementName>
…
```

Asset Model: CMDB (ITIL), CMDBf (DMTF)

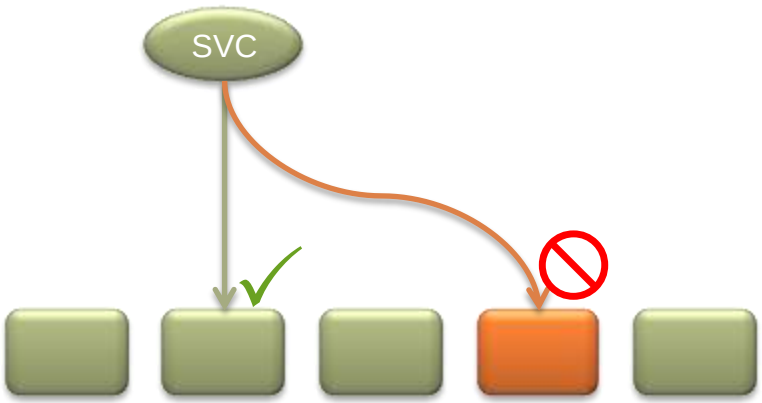


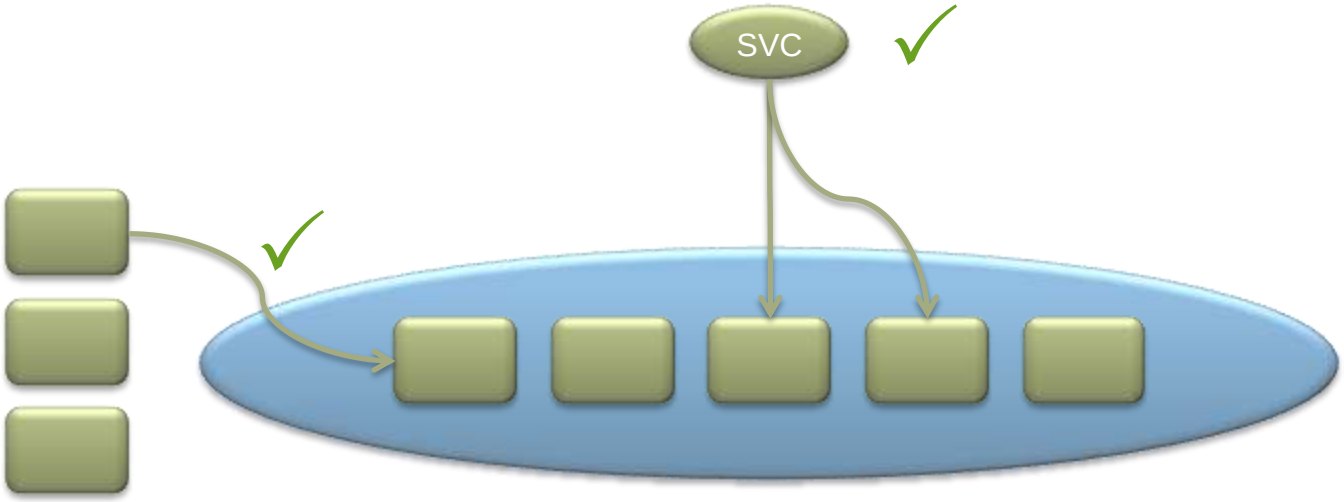
Leveraging a CMDB

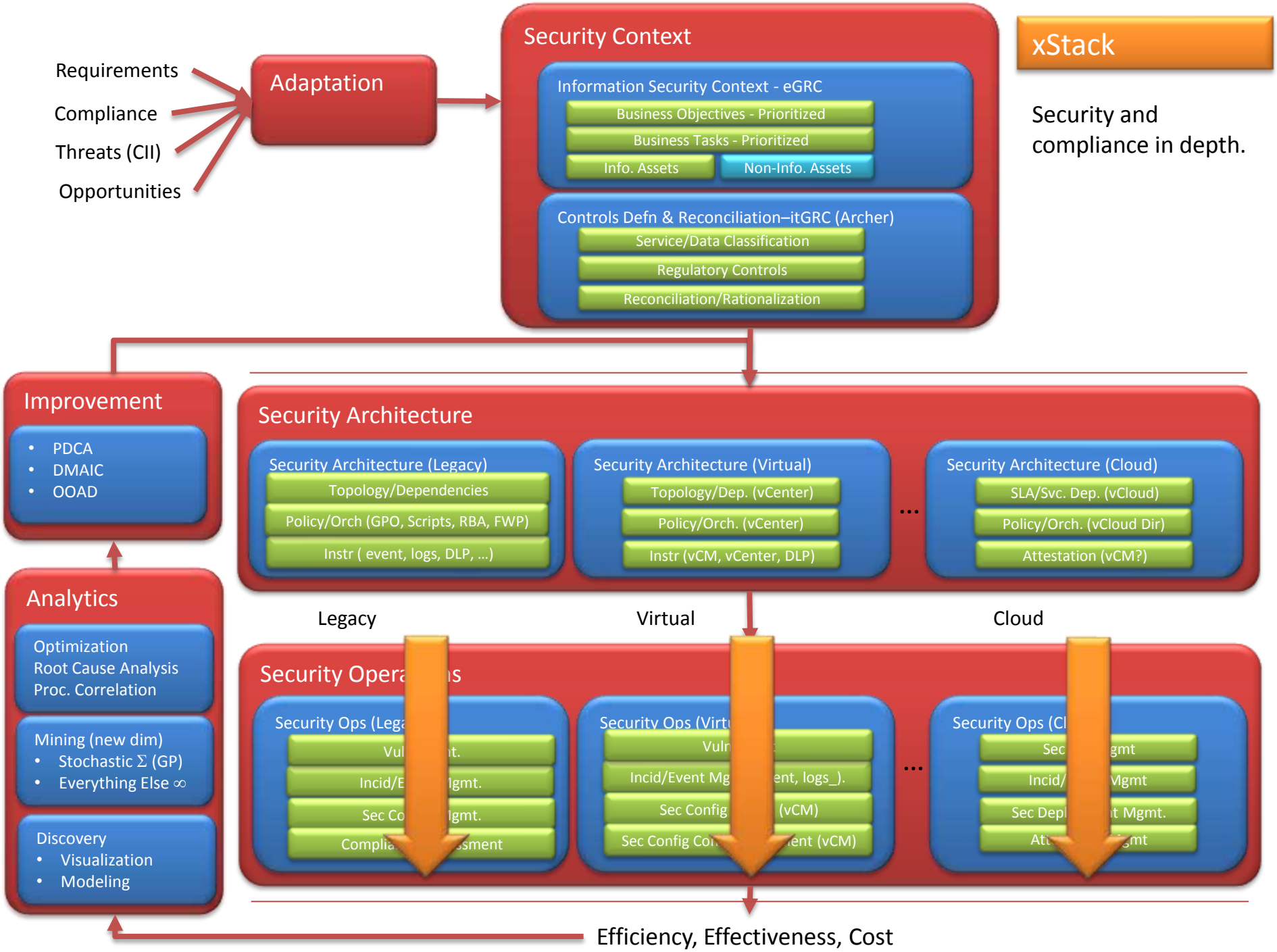
```
<query>
  <itemTemplate id="user">
    <recordConstraint>
      <recordType namespace="http://example.com/people" localName="person"/>
      <propertyValue namespace="http://example.com/people" localName="state">
        <equal>CA</equal>
      </propertyValue>
    </recordConstraint>
  </itemTemplate>

  <itemTemplate id="computer">
    <recordConstraint>
      <recordType namespace="http://example.com/computer" localName="computer"/>
    </recordConstraint>
  </itemTemplate>

  <relationshipTemplate id="usage">
    <recordConstraint>
      <recordType namespace="http://example.co
    </recordConstraint>
    <targetTemplate ref="computer"/>
    <sourceTemplate ref="user"/>
  </relationshipTemplate>
</query>
```

- itemTemplate "user" selects a set of users
- itemTemplate "computer" selects a set of computers
- relationshipTemplate "usage" selects items that have a "uses" relationship from an item in "user" to an item in "computer" and returns these items and relationships

Provisioning Model: Leveraging Dynamics



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xStack
Security and compliance in depth.
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Sec Config (vCM)
Sec Config Co ent (vCM)
...
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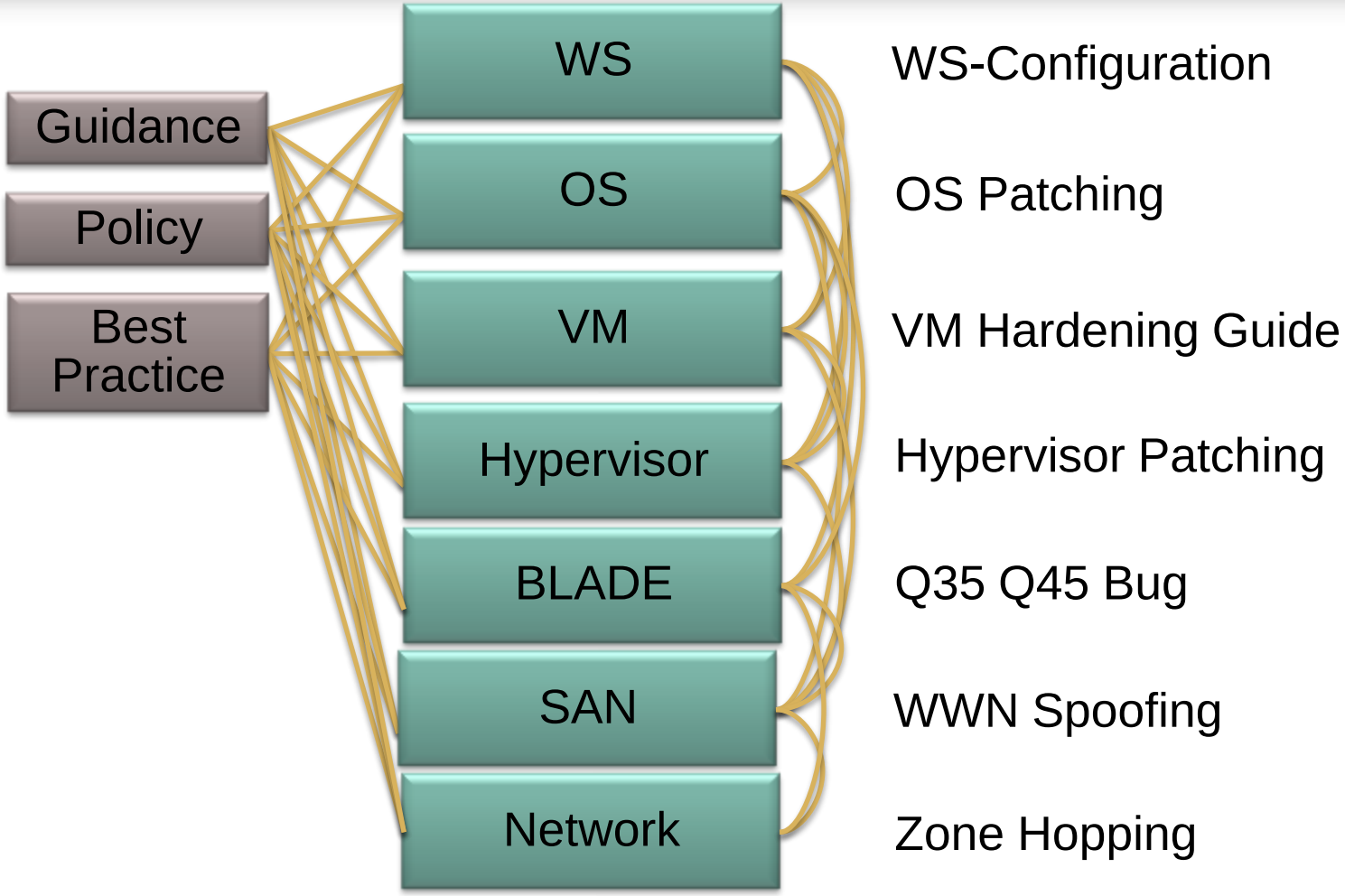
Sec gmt
Incid/ Mgmt
Sec Dep t Mgmt.
Att mt
Efficiency, Effectiveness, Cost

Security Across the Stack



Automated Content: XCCDF, OVAL, CPE, CCE, OCIL

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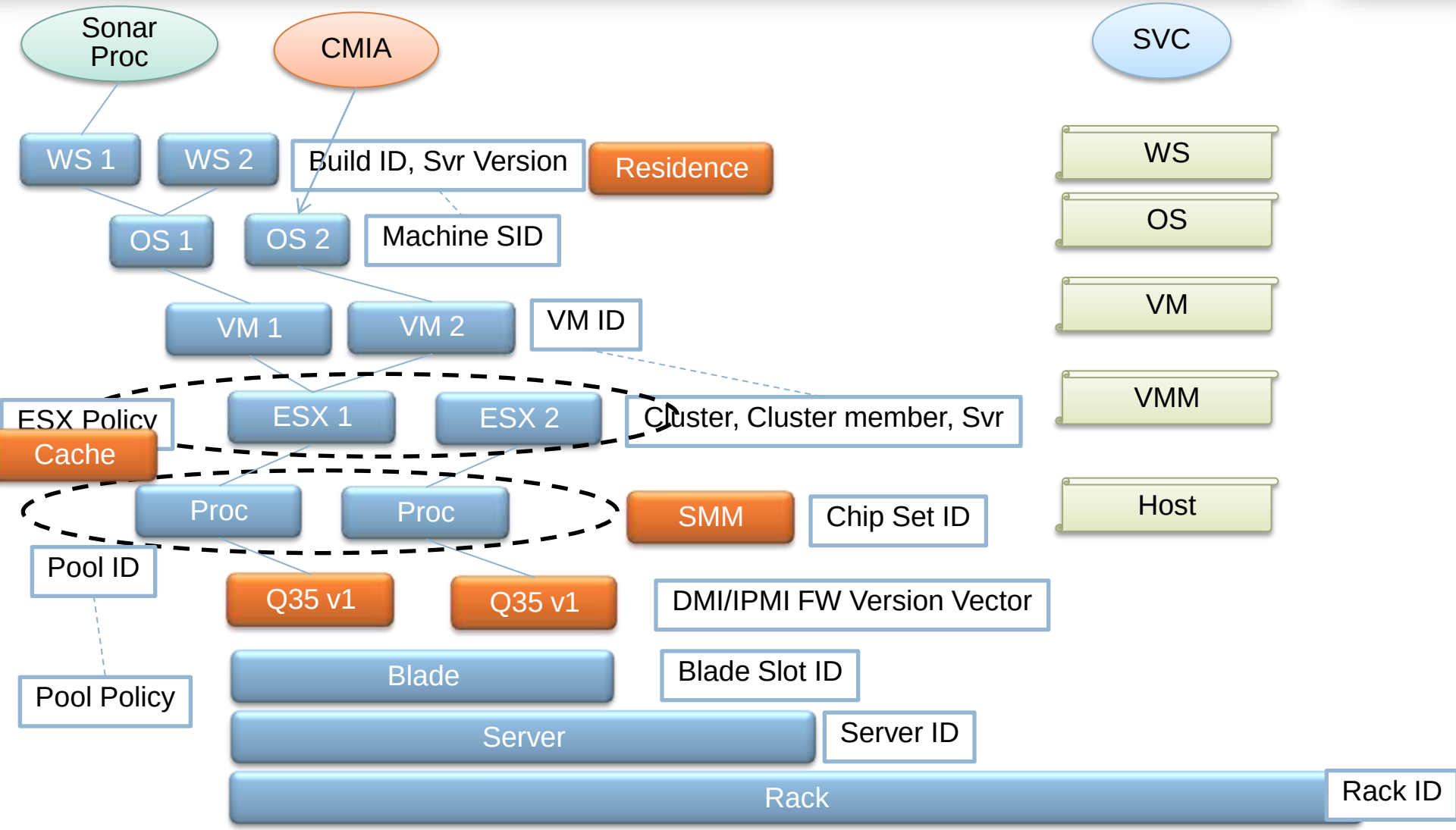
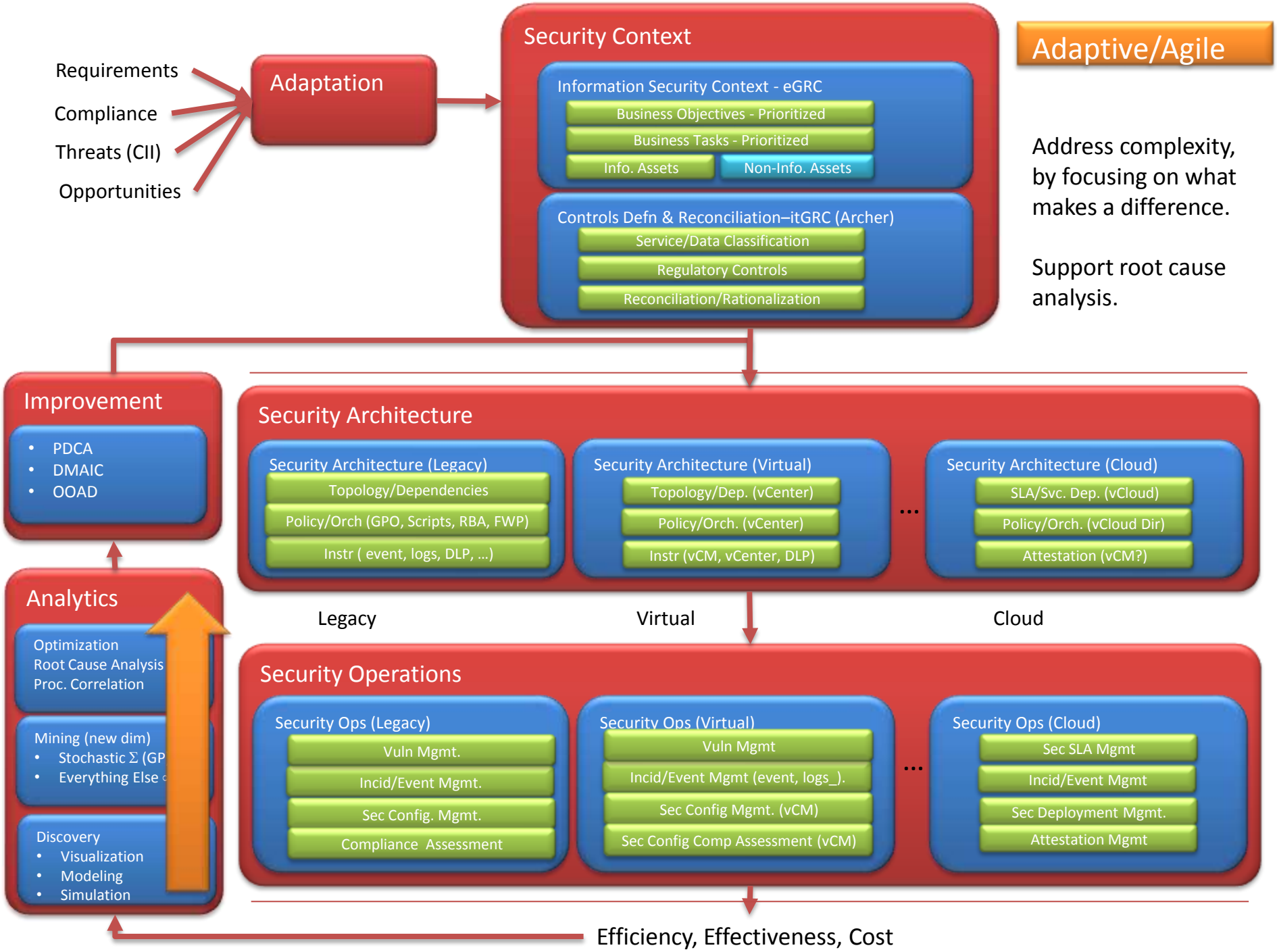
Security Coupling

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Adaptive/Agile
Address complexity, by focusing on what makes a difference.
Support root cause analysis.
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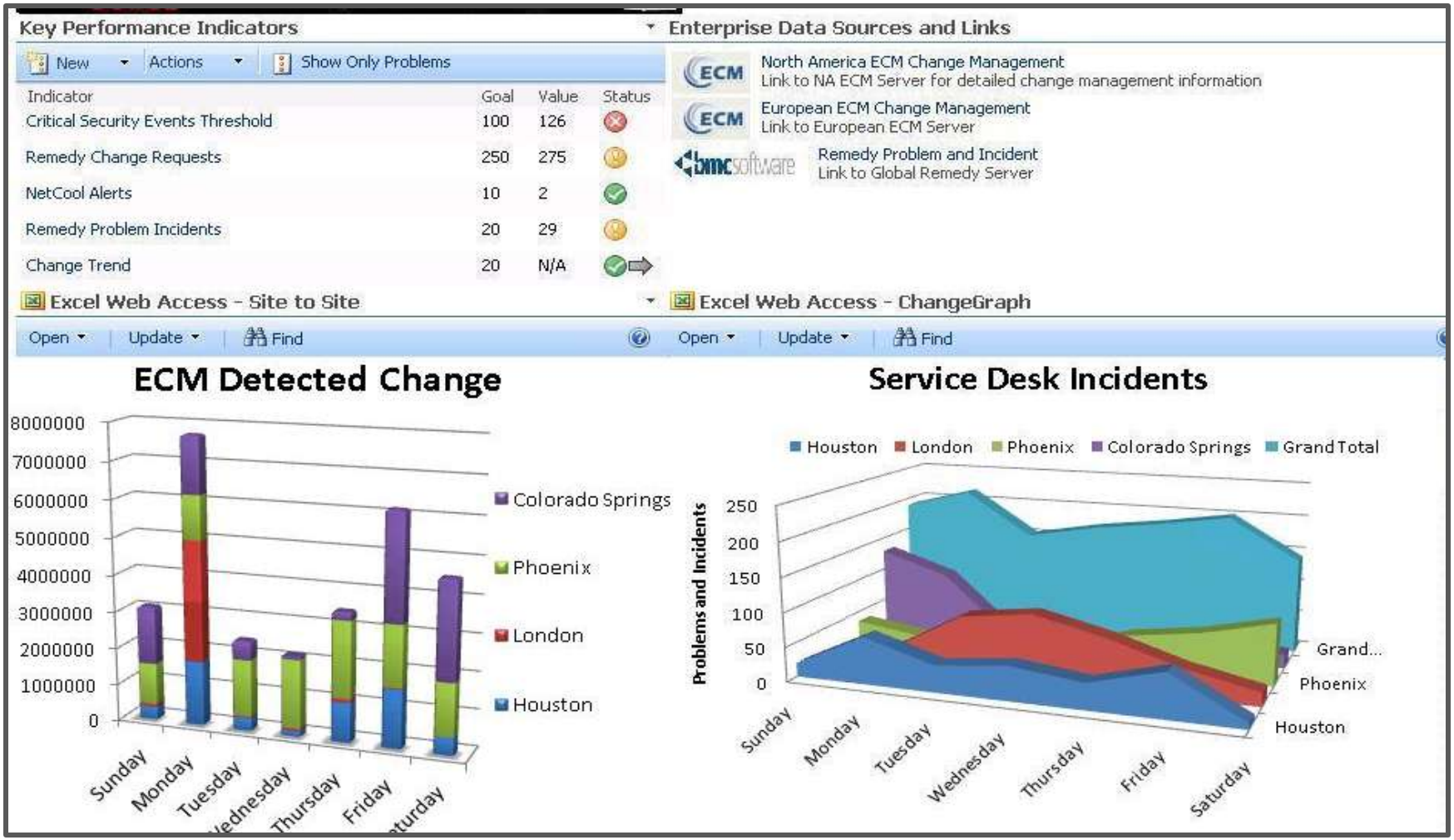
Efficiency, Effectiveness, Cost

AGILTY: Situation Awareness



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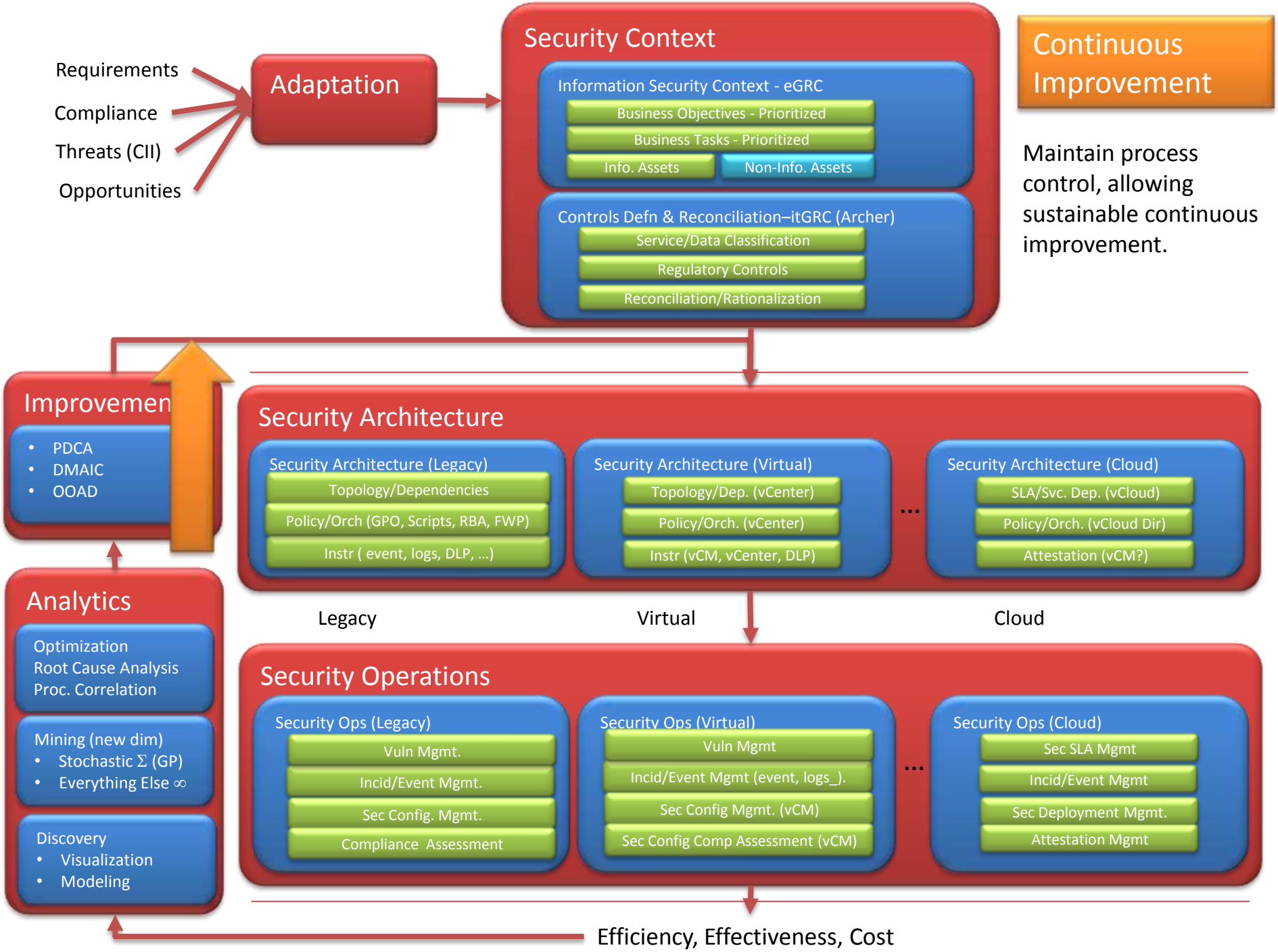
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Maintain process control, allowing sustainable continuous improvement.
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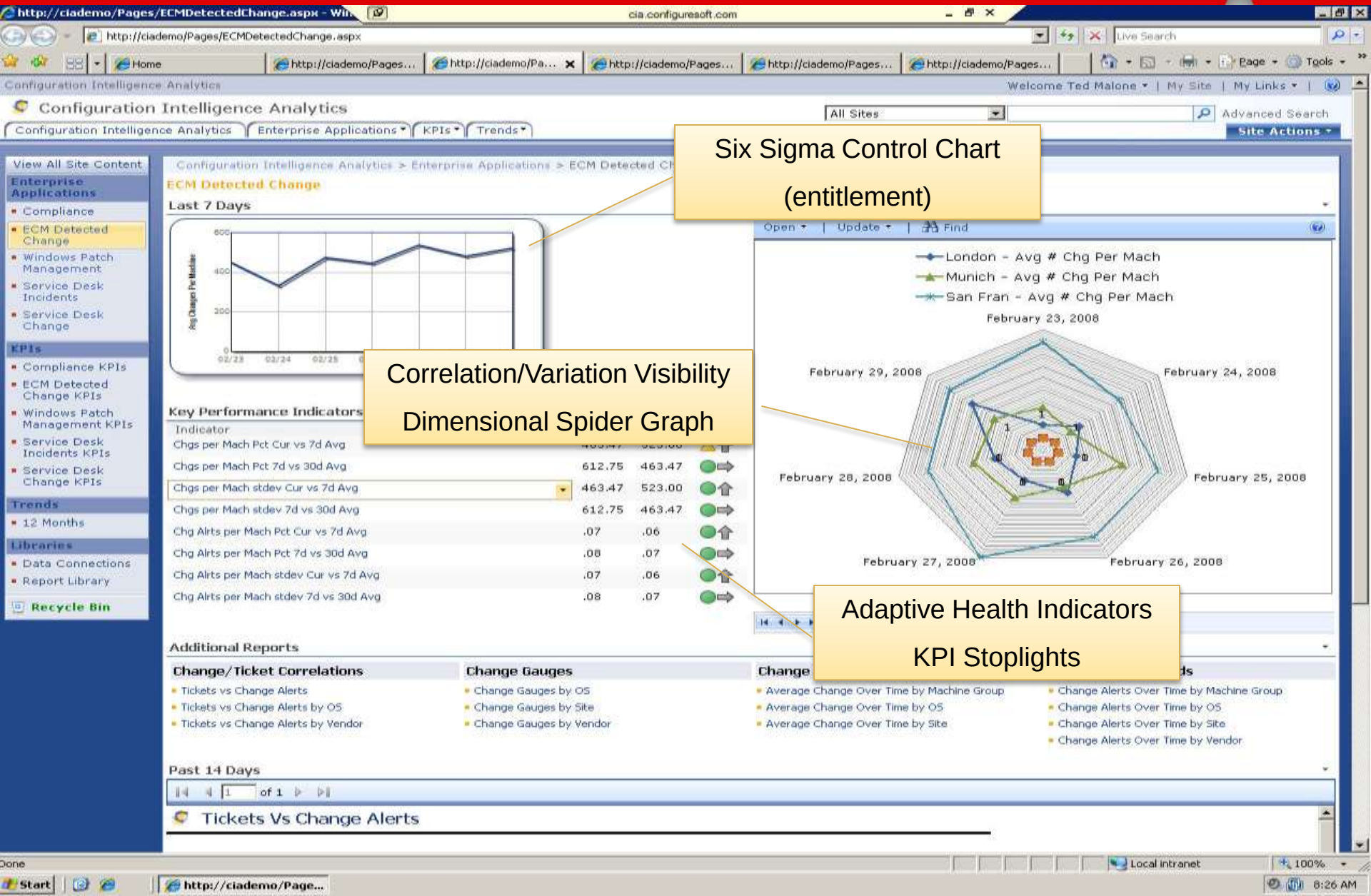
AGILITY: Continuous IMprovement



Summary

- Maintains an accurate picture of an organization's security risk posture
  - Measurements through the GRC lens. Implies common underlying semantics.
- Provides visibility into assets
  - Visibility of relationships, configuration and behavior
- Leverages automated data feeds
  - Security Content: XCCDF, OVAL, CVSS, CPE, CEE, CCE …
  - Operational Context: OVF, CIM, CMDB, SC, WS-*
- Quantifies risk – from Mission/Business objective priority to vulnerability score and coupling
- Ensures continued effectiveness of security controls – closed loop
- Informs automated or human-assisted implementation of remediation
  - Exposes operational constraints, coupling, options
- Enables prioritization of remedies – Probability, Impact (TTR), Constraints, Options, Effort (TTR)

RSA
The Security Division of EMC

Cloud Track Agenda

- 11:45 – 12:30 Security Automation for the Private Cloud:
  - Neil Ziring (Inquisitor) NSA,
  - Mischel Kwon, RSA; Steve Orrin, Intel; Jen Nowell, Symantec, Mark Ryland, Microsoft
- 13:30-14:15 Continuous Monitoring for the Cloud:
  - Kent Landfield, McAfee, Randy Barr, Qualys, Peter Mell, NIST
- 14:30-15:15 Creating Trustworthy Cloud Systems:
  - Ron Knode, CSC, Steve Orrin, Intel
- 15:45-16:30 The Need for Software Security Assurance to Secure Mission Critical Applications in the Federal Cloud:
  - RobRoy, Fortify
- 16:30-17:30 Standards to Accelerate Adoption of Cloud Computing:
  - Lee Badger and Chris Johnson, NIST