# Trusted Compute Pools Feature in oVirt

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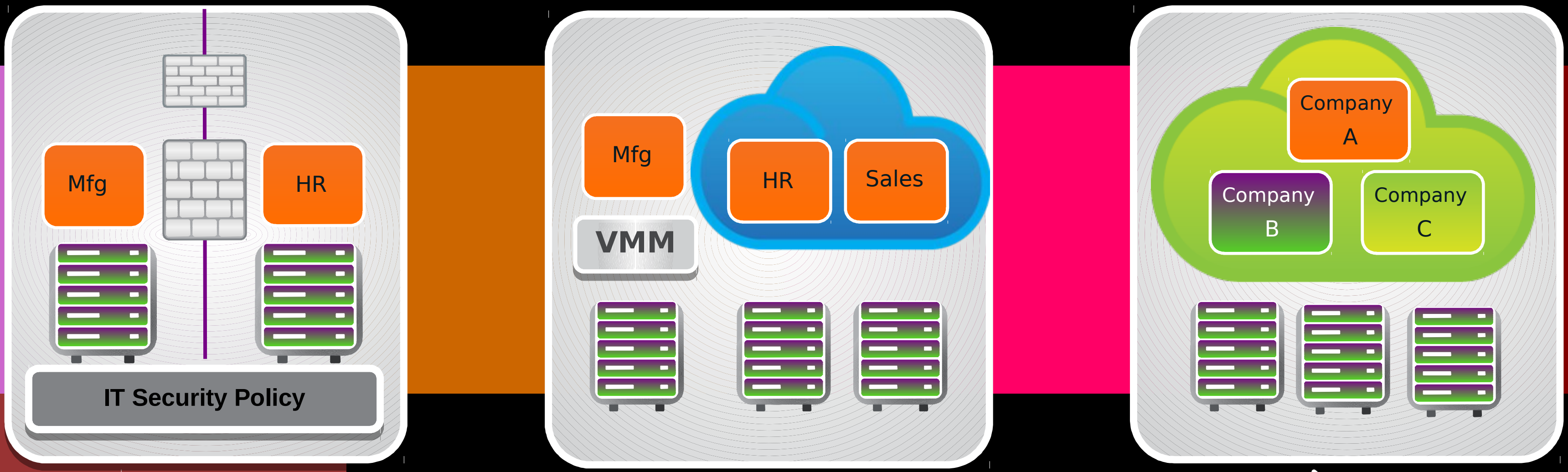
# Agenda

- Background
- Architecture
- Implementation Details
- Summary

# Background

# Datacenter Virtualization Drives New Security Needs



Traditional Data Center

Virtualized and Private Cloud Data Center

Public Cloud Data Center

## Challenges

- **Reduced physical control, visibility**
- **Increased multi-tenancy**
- **Reduced effectiveness/efficiency of existing security toolbox**
- **Increased attack surface**

## IT Pro survey of key concerns:

**61%**
**Lack of visibility** inhibiting *private* cloud adoption1

**55%**
**Lack of control over data** key concern for *public* cloud adoption1

**57%**
**Avoid putting workloads** with compliance mandates in cloud1

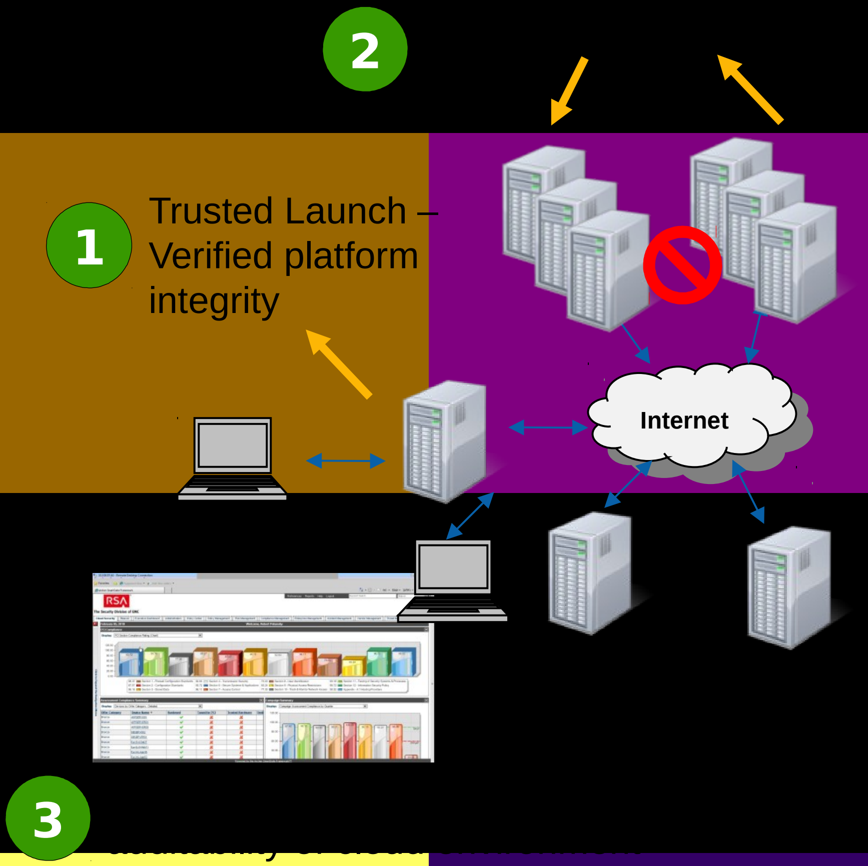
1 source: McCann "what's holding the cloud back?" cloud security global IT survey, sponsored by Intel, May 2012

# Trusted Compute Pools Usage Models

1 **Trusted Boot:** Hardware-based root enforcement of launched environments – reduces malware threat

2 **Trust Based Policy Enforcement:** Control VMMs based on platform trust (and more) – better data protection

3 **Infrastructure Audit and Compliance Reporting:** Hardware-enforced compliance reporting



Trusted Launch – Verified platform integrity

**Trusted Compute Pools:**
**Helps meeting new security needs**

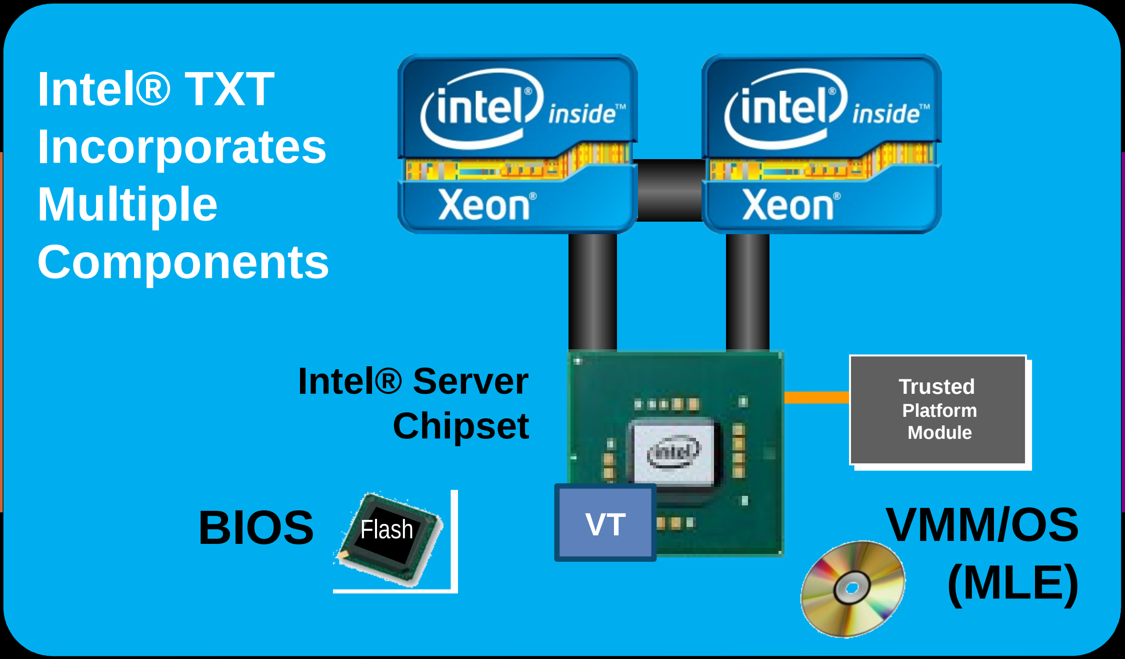
# Trusted Compute Pools Key Components

- Hardware assisted platform integrity measurement
  - H/W platforms with Intel® Trusted Execution Technology support
  - tboot + OS/VMM supporting measured boot based on Intel® TXT
- Remote attestation service providing platform trustworthiness based on platform integrity
  - OpenAttestation providing attestation service & host agent
- Management tools enhanced with Trusted Compute Pools feature

# Intel® Trusted Execution Technology (Intel® TXT)

tamper detection in boot process

- Complements runtime protections
- Reduces support and remediation costs
- Hardware-based increases assura compliance
- Trust status usab
- Trusted Boot(Tbo verified launch of OS kernel/VMM.



Intel® TXT Incorporates Multiple Components

**Hardens and Helps Control the Platform**

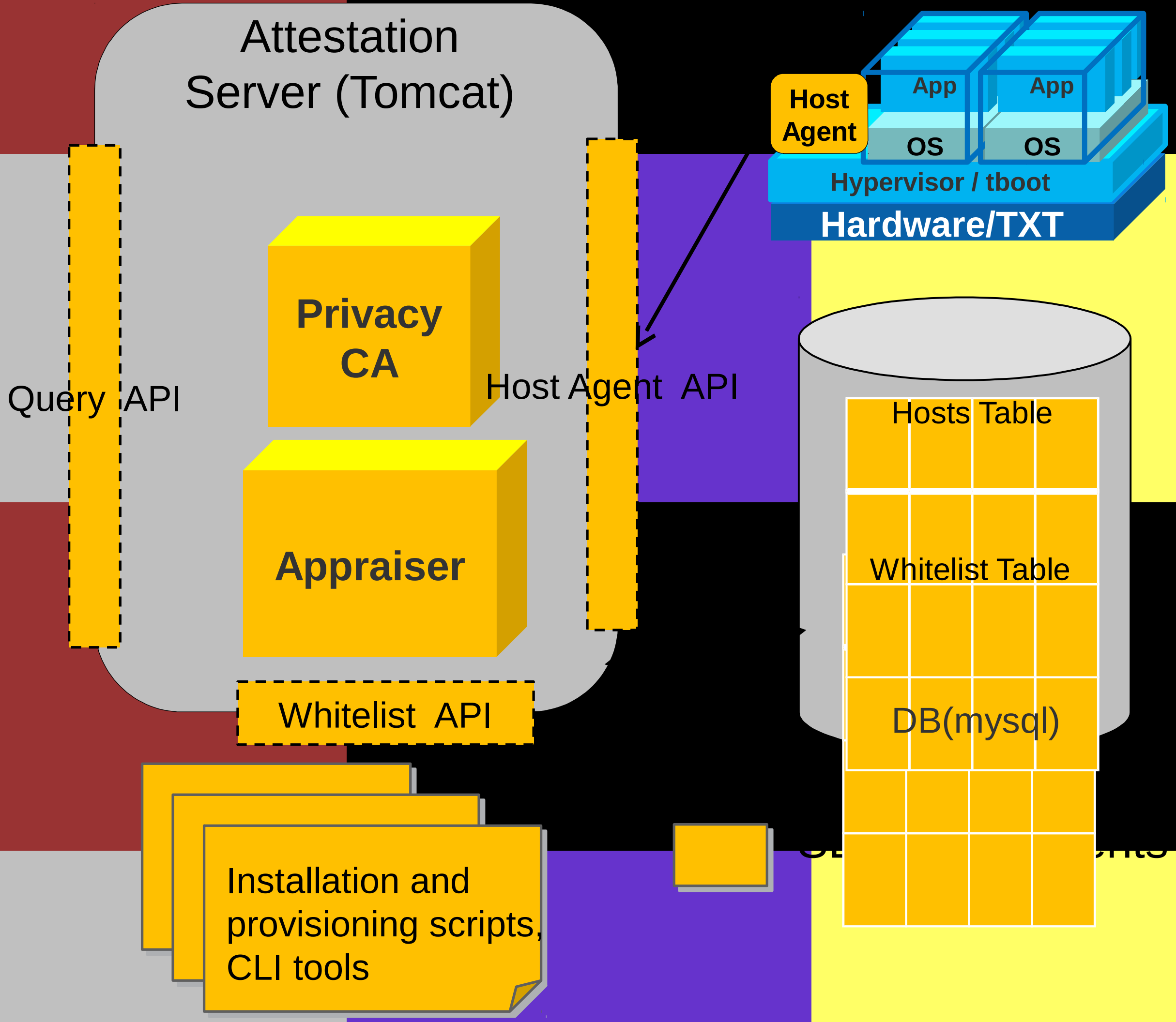
# OpenAttestation (OAT)

- SDK for managing host integrity verification.
- Use TCG-defined remote attestation protocol.
- Target at cloud and enterprise management tools.

https://github.com/OpenAttestation/OpenAttestation.git

- Open Source project established by Intel in Q1’12, v1.6 released in Q4’12, v2.0 released in Q3’13

# OAT Architecture

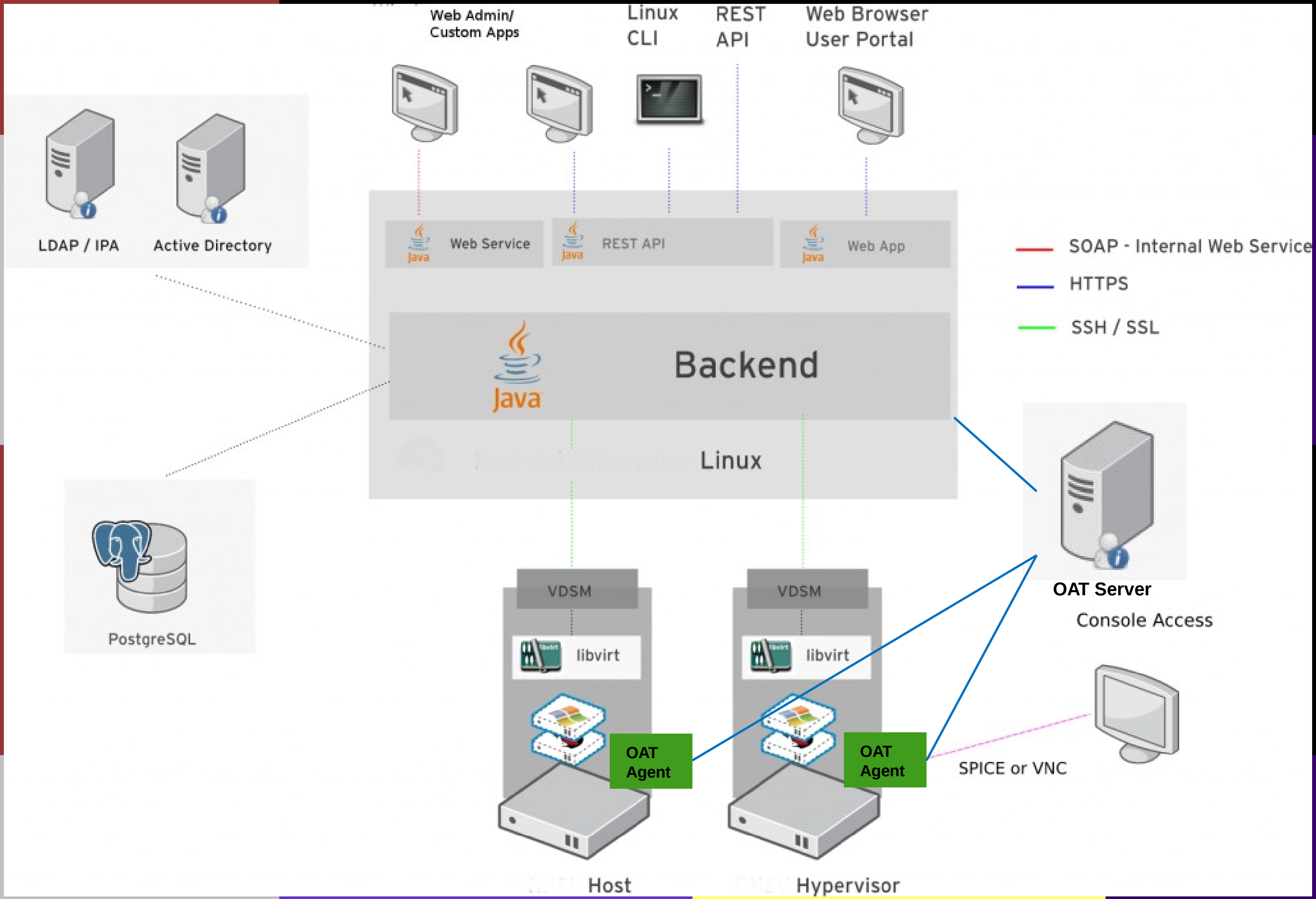


- Privacy Certificate Authority (Privacy CA), Appraiser, Host Agent are Java*
- Host Agent accesses TPM through TrouSerS

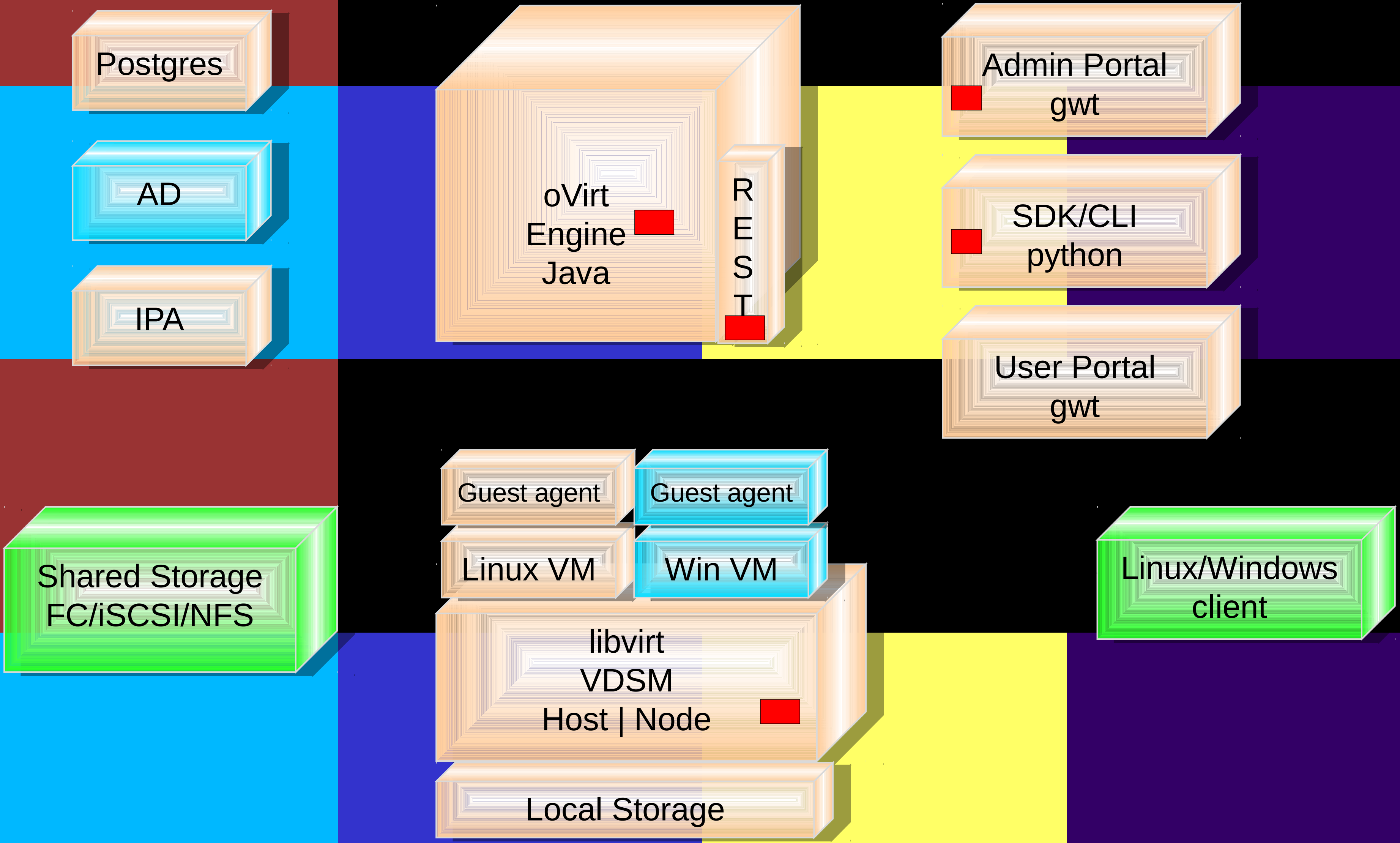
**OAT provides standard RESTful API interfaces**

# Architecture

# Overall Architecture



# oVirt Components Requiring Changes

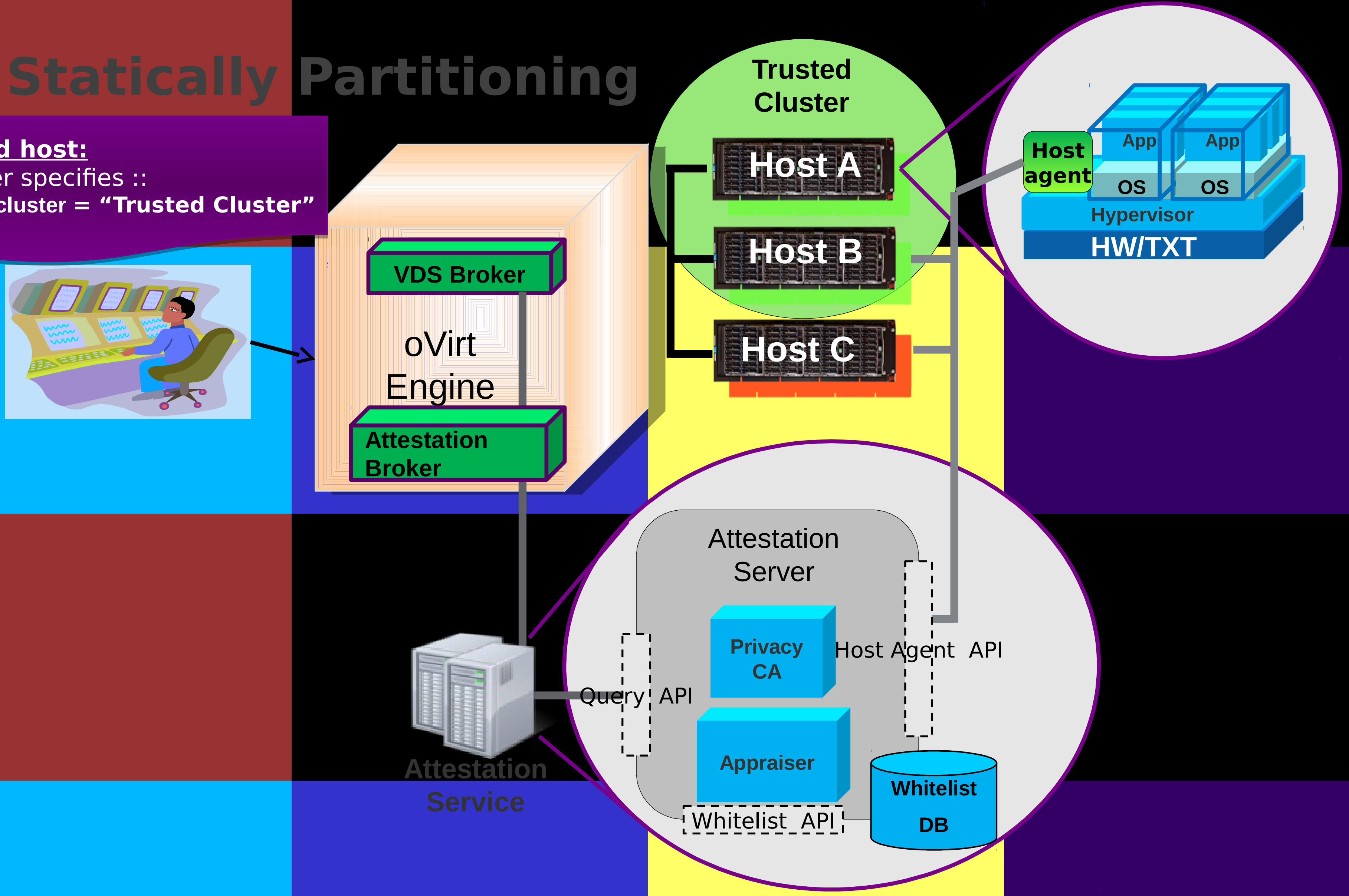


# Statically Partitioning

**Add host:**

User specifies ::

**cluster = "Trusted Cluster"**



# Key advantages

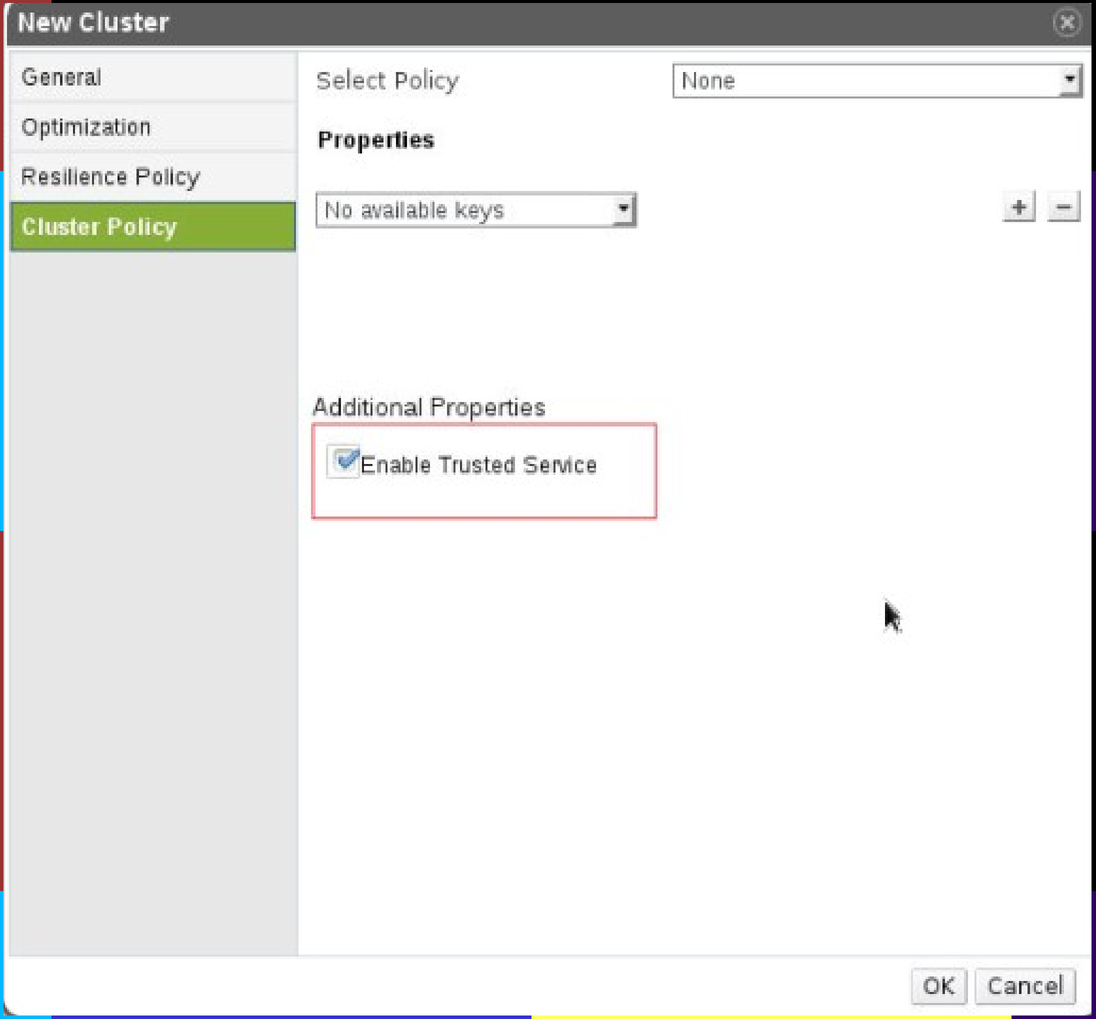
- No migration support issue
- No additional scheduling performance lost

# Implementation Details

# Status

- Feature page: http://www.ovirt.org/Trusted_compute_pools
- Work started since Dec 2012, finished by Aug 2013
- Available in oVirt 3.3(Sep 16, 2013)

# Frontend:



New Cluster

Select Policy: None

**Properties**

No available keys

Additional Properties

☑ Enable Trusted Service

# Backend

- Add attestation check logic in "InitVdsOnUpCommand.java“
  - Trusted host “Up” and untrusted host put as non-operational status
  - Expected trigger conditions:
    - Add a host into a trust cluster
    - Host rebooted
  - Call SetNonOperationalVdsCommand with a new NonOperationalReason
    - Migrate all VMs from the host and then set it non-operational.
- Add aggregated attestation check in Backend.Initialize()
  - Fire a one-time background request from this method to avoid blocking it
  - Do attestation by stages:
    - Configurable max number of attested hosts in stages:
      - Stage 1: FIRST_STAGE_QUERY_SIZE , 10 as default
      - Stage N: SECOND_STAGE_QUERY_SIZE, 20 as default

# Database

- vds_groups table: add a new field, trusted_service.

# RESTful API

```
curl -v -u "admin:password“
    -H “content-type: application/xml“
    -d '<cluster><name>my_cluster</name>
               <trusted_service >true</ trusted_service>
       </ cluster >‘
    'http://engine.***.com:80/api/cluster'
```

- Key relevant modification includes api.xsd and VmMapper.java

# OVF

- A new flag in OVF: trusted_service
  - Record whether the VM is exported from a trusted cluster
- Key relevant classes:
  - OvfTemplate{Reader|Writer}.java
  - OvfVm{Reader|Writer}.java
- Alert for importing a 'trusted' VM into an untrusted cluster
  - Alert via printing event log

# Future Work

- High Availability solution
- Etc.

# Summary

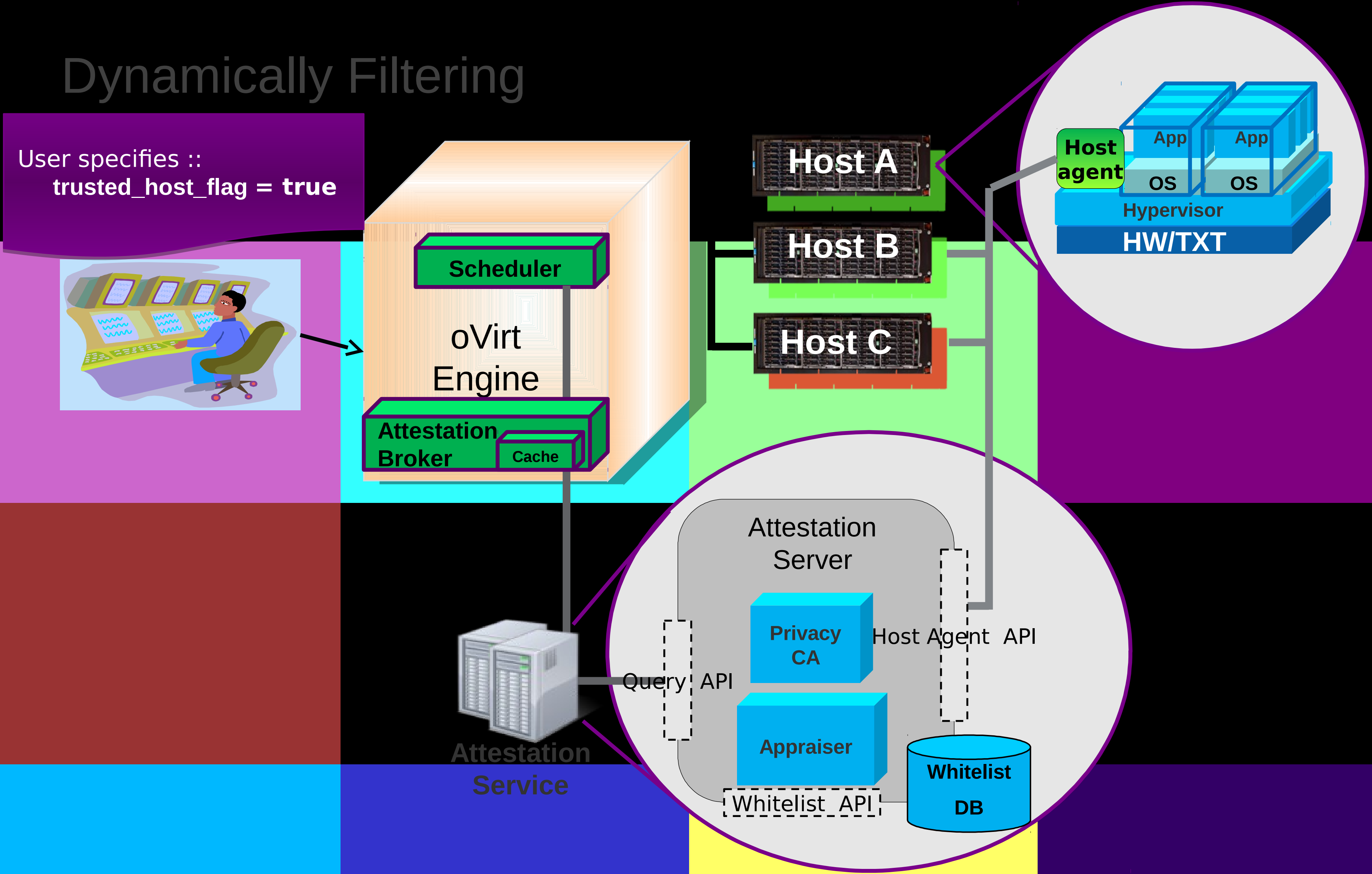
# Trusted Compute Pools Feature in oVirt Summary

- Trusted Compute Pools provides a way for Cloud/Datacenter administrator to deploy VMs on trusted hosts for data protection & service differentiation.
- Intel® TXT provides hardware support for Trusted Compute Pools usage.
- Trusted Boot (tboot) and OpenAttestation (OAT) are two key components for the deployment of Trusted Compute Pools.

# Q&A

# Backup

# Dynamically Filtering



User specifies ::
**trusted_host_flag = true**

# Key issues

- Migration support
- Scheduling performance

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