Hardware Management: Software Agents in Hyperscale Datacenter Systems

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Content

• Path to Hyperscale
• Use Cases
• Challenges
• Current Approaches
• Requirements
• Planned OCP Contributions
• Solution Architecture
• Future
Cloud giants are playing a different game
Everything is a Datacenter

5G / Edge Computing

Cloud

Internet of Things
Unique Challenges

• Data is high velocity, high volume, low variety

• Things are distributed, time is relative, consensus improbable

• Continuously accelerating technology refresh cycles

• Diverse protocols, complex technologies and multiple vendors

• Massive surface area vulnerable to attack
Informed decision making is impossible
Fragmented, inefficiently managed datacenters

- What should I buy? How much capacity?
- Improve Performance? Increase Efficiency?
- What do I have? What is it doing?
- What did I order? Does it work?
- What settings for my workload?
- What OS, packages, drivers and apps?
- How do I run this across my datacenters?
## Current Approaches

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<th>Components</th>
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- ✔ Small footprint
- ✔ Highly scalable
- ✔ Installs in minutes
- ✔ Generic data model
- ✔ Guaranteed performance
- ✔ Purpose built for machines
In Need of a Solution...

• Opensource – owned by the community

• Modern – lightweight, extensible, agnostic

• Standardized – works with existing common tools and interfaces

• Secure – industrialized for the world’s mobile communication networks

• Supported – developed in commercial products, used in production environments
## Ericsson Proposed Contribution

*Client software for data collection and configuration of x86 machines*

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<th>Component</th>
<th>Description</th>
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<tr>
<td>Agent</td>
<td>Standard Linux package for data collection and configuration of x86 machines</td>
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<tr>
<td>Mini Agent</td>
<td>Collector, Filter, Forwarder components for composition of unique and lightweight data collection use cases</td>
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<tr>
<td>Micro Kernel</td>
<td>Minimalist bootable Linux kernel + agents and process automation tool chain for building stateless deployment</td>
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<td>Collectors</td>
<td>Standard collectors for x86 Hardware and Linux Operating Systems</td>
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Anatomy of an Agent

COLLECTORS
• /proc
• ipmi
• lsusb
• ...

FORMATTERS
• JSON
• XML
• TSV
• ...

FORWARDERS
• TCP/UDP
• Graphite, Spark
• Socket
• ...

Ericsson Security, Audit & Performance Enhancements

Any Standard Linux Environment (bin, container, microkernel)
Agent Requirements

• Build once, run anywhere (lowest common denominator)
• No external dependencies
• Use standard tools when available
• Fail hard, restart fast
• Self-configuring, self-updating
• Completely tunable and extensible
Architecture

DATA
OS & Hardware Inventory, Metrics & Logs

CONTROL
Configuration of Firmware, BIOS, RAID & OS

API | GUI | CLI

SNMP, IPMI, LLDP, DCMI, Redfish, TCP/IP

DNS, DHCP, TFTP, PXE, IPMI, REST

HOST

NETWORK

Agent

Datastore

Agent
Software Defined Infrastructure

Data Center Simulator

Resource Management

Real-Time Analytics

Complete Visibility

Process Automation

Collection

Marketing

Finance

IT

Other Business Partners

OSS / BSS

DC Operation & Business support

Virtual Infra Management

Software Resource Pool

POD/vPOD

Hardware Resource Pool

NMS / SDN Control

IT Infrastructure: Compute, Network, Storage

Data Center Infrastructure Management

DC Facility: Power, Cooling, Building

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## End Users as of February 2017

### Americas
- Undisclosed (NFVi)
- Undisclosed (IT)
- Undisclosed (NFVi)
- Telefónica, Peru (NFVi)
- Telefónica, Colombia (NFVi)

### Europe & Middle East
- Swisscom, Switzerland (NFVi)
- Telefónica, Germany (NFVi)
- Undisclosed (NFVi)
- Undisclosed (NFVi)
- Undisclosed (NFVi)
- Undisclosed (NFVi)
- RIKS, Estonia (IT)
- Undisclosed (IT)
- Undisclosed (NFVi)
- Undisclosed (NFVi)
- Undisclosed (NFVi)
- Undisclosed (IT)

### Asia Pacific
- SKT, Korea (IT)
- Far Eastone, Taiwan (IT)
- Undisclosed (NFVi)
- Telstra, Australia (NFVi)
- Undisclosed (IT)
- VHA, Australia (NFVi)
- Undisclosed (IT)

### Africa
- Undisclosed, NFVi, IT
FUTURE: Automated Factory
Intelligent data center

Continuously improving throughput, while optimizing cost structure

The Autonomous Data Center

Continuous Integration
Continuous Deployment
Self-Learning
Self-Organizing