

Next Generation DataCenter

GNU/Linux within the HDS 8000 project

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About us

- Nimium d.o.o. employees
- System engineers/integrators
- RHCE, subspecializations

Relationship with Ericsson

- Working together for quite a few years
- Various projects across multiple departments within Ericsson
 - Georeduntant Cluster infrastructure
 - Wireline projects
 - OpenStack projects
 - Workshops
- Covering a broad scope
 - Planning
 - Implementation
 - Education
 - Development
- The latest cooperation is related to the HDS 8000 project

HDS 8000

- The cooperation relates to the part of the HDS 8000 project located in Croatia
 - System integration and verification (SIV) team
 - Test automation framework (TAF) team
- Supporting GNU/Linux-related activities for the past year

GNU/Linux in HDS 8000

- The hardware is x86, based on Intel's Rack Scale Architecture
- GNU/Linux is a great match for x86
 - Both from the price and the performance perspective
- There are various points from which GNU/Linux is relevant to the HDS 8000
 - As a fully-supported deployment platform offered to customers
 - As a platform for internal testing and solution development

Broad scope of open-source software

- Server infrastructure
 - RHEL, Ubuntu, SLES...
 - IPMI, SNMP, monitoring, backup, CM...
 - PXE, kickstart, integration...
 - Testing...
- Workstation infrastructure
 - Automatization, interaction, interpretation...
 - Testing...
- Network infrastructure
 - SDN integration, VLAN, routing, optimizations...
 - Testing...
- Testing infrastructure
 - Artifact lifecycle, CI, test case automatization, UI testing and automatization...
 - Testing...
- Authorization, authentication, security, auditing, (testing...)
- ... A lot of small things...
- (More from my colleague)

Our roles and responsibilities

- Small to large
 - Operative tasks
 - Design and implementation
 - Know-hows
 - Workshops
- In summary
 - Knowledge transfer
 - Consulting
 - OSS expertise
 - Enterprise Linux
- What we do best

Collaboration

- With SIV team
 - Testing
 - Bug identification
 - Access
 - Environment
- With TAF team
 - Linux specifics
 - Linux behaviour

GNU/Linux in HDS 8000

- Several GNU/Linux distributions are used within the HDS 8000 project
 - Ubuntu
 - RHEL
 - SLES
 - Embedded distributions (MontaVista)

GNU/Linux in HDS 8000

- Various programming languages and services are running on GNU/Linux
 - In-house tools
 - Mostly based on Go and Java programming languages
 - System services and daemons related to the infrastructure operation
 - Monitoring and auditing
 - Network infrastructure
 - System operation and management
- The number of services is quite large
 - Some of the services are shared between both SIV and TAF teams
 - Some of the services and tools used are specific for a team

GNU/Linux in HDS 8000

- There are some other factors that need to be taken into account when discussing software in HDS 8000
- Some of the services are parts of the infrastructure itself
 - Software enablers for daily tasks within a team
 - Infrastructure software needed to keep the lab environments running
 - New elements that get introduced into ecosystem in order to support new product functionality
- Some of the services are part of the deployment process
 - Software which is used in a particular phase of project development or release
 - Software which gets shipped to the customer as part of the product

GNU/Linux in HDS 8000

- From the infrastructure point of view
- The entire project is within the Ericsson infrastructure
 - No cloud providers, aside from Ericsson itself :)
 - No managed infrastructure, except via Ericsson staff
 - Parts of the services overlap with Ericsson's existing infrastructure
 - Hard to integrate without service disruptions
- Overlapping services
 - DNS
 - DHCP
 - TFTP
 - FTP
- Basic infrastructure services

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- From the infrastructure point of view
- Part of the infrastructure is still being built
 - Some design challenges involved
 - A lot of moving parts
- Centralized authentication
- Log management
- Configuration management
- Auditing

GNU/Linux in HDS 8000

- The application side consists of multiple services
- Little to no duplication of existing Ericsson infrastructure
- A large amount of tooling already in place due to existing projects
 - Artifactory
 - Jenkins
 - Gerrit
- Project-specific software
 - LXD
 - Docker integration (WIP)
 - NGINX

GNU/Linux in HDS 8000

- Infrastructure challenges
- Sharing resources between teams
 - TAF needs resources to develop testing framework
 - SIV needs resources to test existing and new product features
- Sharing resources between team members
 - Continuous Integration
 - Manual testing procedures
 - Automated testing - development and implementation
- Product contains both software and hardware components
- Limited hardware resources
- Various revisions of Ericsson hardware (also some third party hardware)

GNU/Linux in HDS 8000

- Hardware part is fairly simple (in theory, at least)
- Software part is somewhat complicated
 - Included software covers a broad scope of infrastructure management functionality
 - Monitoring
 - Basic provisioning features
 - Power management
- Some provided services clash with both Ericsson infrastructure and existing lab infrastructure
 - They need to be tested
 - Cannot affect operation of other systems
- Mostly solved by isolating test environments according to purpose

GNU/Linux in HDS 8000

- Simulating a large number of client systems
- LXD
- Lightweight virtualization
- Supports isolation and resource limits
- Running on the same kernel, but not a limitation at this point
- Density
- Complementary to standard virtualization solutions (i.e. KVM)
- Little overhead, the biggest constraint was disk space
 - Due to used configuration and the fact we were early adopters
- REST API

GNU/Linux in HDS 8000

- Various monitoring solutions used within the project
 - Part of the project provides monitoring capabilities
- Observium
- Zabbix
- Nagios
- Other tools needed to verify in-project functionality
- Monitoring resource usage
 - To determine and verify resource requirements
 - To monitor system behaviour under load
- Basic availability monitoring

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- Configuration management
- Still work in progress
- Some testing of SaltStack
- Issues with logical organisation of hardware
 - Most hardware “blocks” are isolated from other hardware
 - Challenges when designing systems that rely on a master component
 - Network isolation depending on physical hardware location
- The solution needs to be flexible enough, yet easy to become familiar with
 - Infrastructure is expendable at this point

GNU/Linux in HDS 8000

- Authentication and auditing
- Still not implemented
- Will be based on standard GNU/Linux tools
 - auditd
 - syslog
 - Some consideration given to FreeIPA
- Needs to be able to authenticate network devices
- Needs to be able to authenticate users and grant sudo rights
- Will be used by both real users and various tools

GNU/Linux in HDS 8000

- Backup implementation
- Work in progress
- Challenges similar to authentication implementation

GNU/Linux in HDS 8000

- A large number of development tools runs on GNU/Linux
- IDE
- Test development harness
- Developer workstations
- It is currently the most widely used operating system within the HDS 8000 project
- It is of strategic importance to the success of the project

GNU/Linux in HDS 8000

- Thank you for your attention
- Questions?