2nd Linux Future Committee

2021-03-24

Ben Morrice on behalf of IT-CM-LCS

Linux Future Committee mandate

"Provide a structured working group with the focus of:

- *Reviewing scenarios*
- *Understanding impact on current Linux usage*
- *Providing input on future roadmaps*

for a Linux operating system that satisfies the needs of the CERN community"

Update on current Short-term Plan

- Centos Stream 8 repositories are mirrored at linuxsoft (http://linuxsoft.cern.ch/cern/centos/{s8,s8-testing,s8-snapshots})
- Docker and OpenStack (TEST) images are available
- Locmap is available for CS8
- Most puppet managed infrastructure is now aware of CS8

    - Monitoring support is currently lacking

Latest events

- HEPiX Presentations

    - "Linux at CERN"

        - slides: https://indico.cern.ch/event/995485/contributions/4256466/attachments linuxatcern.pdf
        - recording: https://indico.cern.ch/event/995485/contributions/4256466/attachments

    - "RedHat Products and Programs"

        - recording: https://indico.cern.ch/event/995485/contributions/4256463/attachments

Latest events

- HEPiX BoF

    - "Birds of a Feather (BoF) session: Linux Discussion"

- slides:
  https://indico.cern.ch/event/995485/sessions/386343/attachments/2209
- recording: https://videos.cern.ch/record/2756412

What we know today

- Future Linux distributions will be RPM based

  - Efforts required for retraining and retooling are too high to move away from RPM

- Future Linux distributions will need to support both x86_64 and aarch64

  - Many (several thousand) SoC systems will soon come online with aarch64

- Multiple Linux distributions are probably inevitable to support all use cases

  - CentOS Stream will be used for SIGs, however the life cycle of Stream does not fit all use cases

- CERN is working with Fermilab and other scientific sites to align with common roadmaps

Legend

Distribution	Description
CC7	CERN CentOS 7
CC7	CERN CentOS 7 (outside of maintenance)
C8	CentOS Linux 8
CS8	CentOS Stream 8
CS8	CentOS Stream 8 (outside of maintenance)
CS9	CentOS Stream 9
EL8	Enterprise Linux 8 RHEL (RedHat Enterprise Linux) / RHEL rebuild (Rocky, Alma, Springdale, etc)
EL9	Enterprise Linux 9 RHEL (RedHat Enterprise Linux) / RHEL rebuild (Rocky, Alma, Springdale, etc)
	A major Operating System change that would be disruptive (implying a reinstall)

Potential future

2021 H1	2021 H2	2022 H1	2022 H2	2023 H1	2023 H2	2024 H1	2024 H2	2025 H1	2025 H2	2026 H1	2026 H2	2027 H1
LS2		Run 3						LS3				
CC7												
C8												
	CS8											
	EL8 Beta	EL8										
	CS9 Beta	CS9										
		EL9										

Potential upgrade paths

	2021 H1	2021 H2	2022 H1	2022 H2	2023 H1	2023 H2	2024 H1	2024 H2	2025 H1	2025 H2	2026 H1	2026 H2	2027 H1
LHC Schedule	LS2		Run 3						LS3				
1. CC7 → EL8	CC7			CC7 / EL8				CC7	EL8				
2. CC7 → EL9	CC7			CC7 / EL9				CC7	EL9				
3. CC7 → CS9	CC7			CC7 / CS9				CC7	CS9				
4. C8 → CS8 → EL8	C8	C8 / CS8	CS8	CS8 / EL8				CS8	EL8				
5. C8 → CS8 → EL9	C8	C8 / CS8	CS8	CS8 / EL9				CS8	EL9				
6. C8 → CS8 → CS9	C8	C8 / CS8	CS8	CS8 / CS9				CS8	CS9				

Consolidation of concerns gathered

(so far)

- CC7 EOL (30.06.2024) occurs during RUN3

    - Security team will tolerate non-GPN hosts (TN) that run past EOL, owners assuming all responsibility
    - RUN3 could potentially be extended into 2025 (not yet confirmed)

- CC7 EOL (30.06.2024) occurs during RUN3

    - A solution needs to be found for GPN hosts that need to operate during RUN3 past CC7 EOL

        - Option #1: The "Next" Linux Operating system is used exclusively (if available)
        - Option #2: Experiments remain on CC7 for the full duration of Run3,

however mitigate risk by deployment of reverse proxies running on newer linux distributions
- Option #3: Request additional exemptions from IT Security
- Option #4: Assess if CERN IT can rebuild errata from RedHat (EL7 ELS) and release internally. This option would require buy-in from management and extra human resources allocated to IT

- RHEL7 EOL (30.06.2024) occurs during RUN3

  - IT-DB will require Extended Life Cycle Support (ELS) for the machines hosting databases used by the accerator sector
  - As this incurs a cost, how many hosts will this be?

- CentOS Stream 8 EOL (05.2024) occurs during RUN3

  - Not an obvious choice due to similar EOL as CC7 (with the same concerns), however brings new software/kernel versions
  - Can be upgraded to "Enterprise Linux" 8 (EL8) in the future

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- Decision for 'Next' distribution needs to be made ASAP

  - CMS and ALICE requests this to be able to adequately plan for RUN3. CC7 is not an option to use for RUN3 at CMS

- RedHat kernel is too old to support new hardware

  - BE-CEM-EDL report this

- RedHat provided tools, libraries, compilers missing or old

  - BE-CEM-EDL report this

- SoC OS preferred be the same as 'general' OS

  - To simplify management and security updates, some departments would prefer the operating system used for 'general usecases' to be the same as the operating system used on System-on-Chips
  - SoCs are aarch64
  - Requested by ATLAS, CMS, Beams, Radio Protection

- RPM based distribution is preferred

  - reduce cost of switching
  - Preferred by at least IT-ST, ATLAS

- 1 year overlap between supported releases is required

  - Important for IT-ST, CMS
  - Impossible to migrate systems between 1 day and the next

- Support for remote installation

  - BE prefers this for underground systems

- Distribution should be able to run Oracle clients

    - Requested by ALICE DCS, CMS

- Distribution should be able to run WinCC OA

Are we missing any concerns ?

What's next ?

- Wait for RedHat to release details on the 'low cost' / 'no cost' academic licensing scheme

    - Determine if the above fits CERN and the wider HEP community use cases
    - If not feasible to use across all use cases, perhaps useful for Oracle/WinCC OA

- Wait for the Rocky Linux community to release a viable product

    - First release -> March 31st
    - Will the momentum continue long term?
    - Can CERN along with Fermilab contribute and become a 'backup' in the event that the community disbands?

Key takeaways

- No decision has yet been made for the 'Next' distribution

    - Options will be

        - CentOS Stream 8/9
        - RHEL 8/9
        - RHEL 8/9 clone (Rocky, Alma, etc)

- Groups that require a decision today in order to plan for RUN3, please refer to slide 10 (Potential upgrade paths) points 1 and 4

    - Most likely moving to CS8 is your best option, as this allows for a trivial upgrade path to EL8 at a later date