



From Micro to Mighty: a journey from the DC to the edge

CODECO Industrial Workshop

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The Device Edge Ecosystem

not a datacenter



Medical



Automotive



Industrial



Agricultural

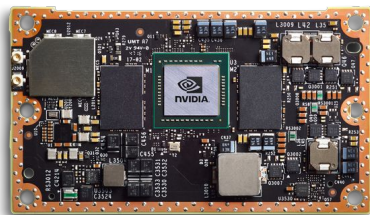
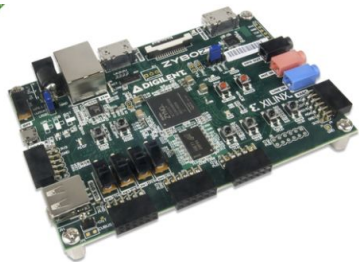


Defense



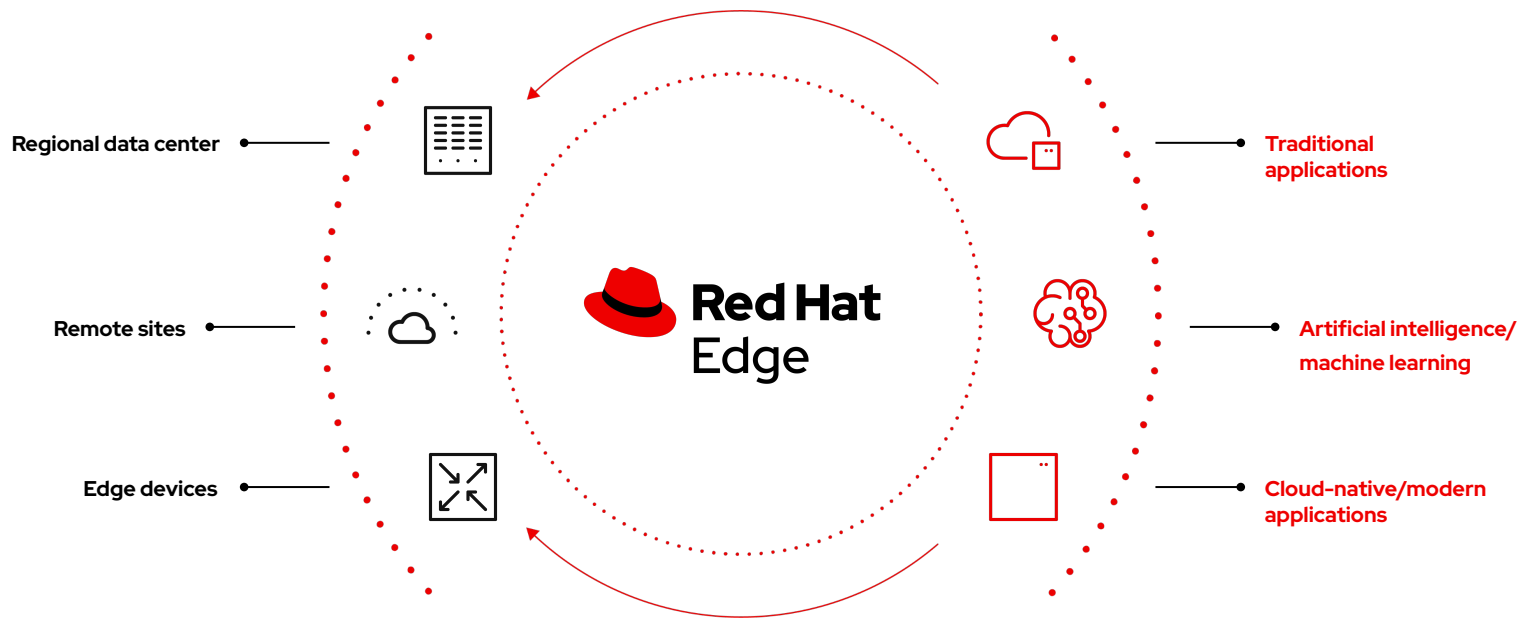
Smart cities and Buildings

<https://www.redhat.com/en/technologies/device-edge>



Red Hat's approach to edge computing

Flexibility and freedom to run workloads where they're needed



Red Hat platforms for the edge

Device edge platform

Red Hat Enterprise Linux with minimal profile and tooling for Edge devices + MicroShift

Single-node edge servers

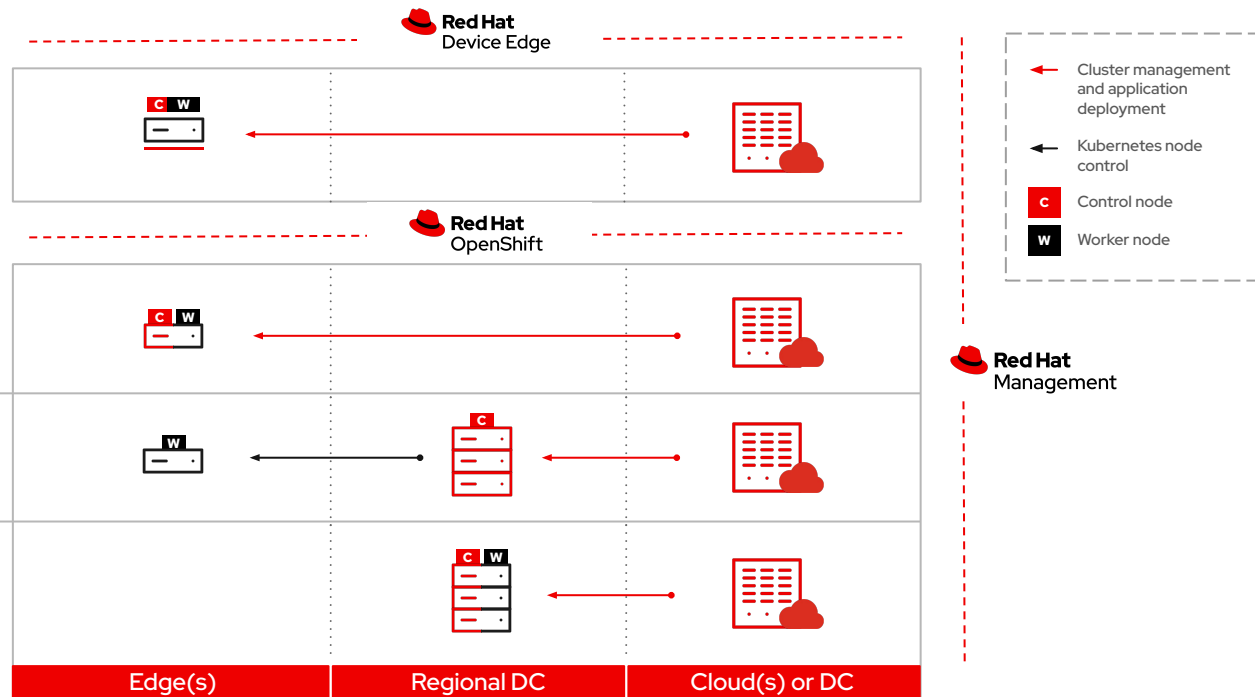
Low bandwidth or disconnected sites

Remote worker nodes

Space-constrained environments

3-node clusters

Low footprint clusters with high availability



Edge Optimized OS

Ensured stability and deployment flexibility



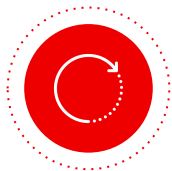
Quick image generation

Easily create purpose-built OS images optimized for the architectural challenges of the edge.



Edge management

Secure and scale with the benefits of zero-touch provisioning, fleet health visibility, and security remediations throughout the entire lifecycle.



Efficient over-the-air updates

Updates transfer significantly less data and are optimized for remote sites with limited or intermittent connectivity.

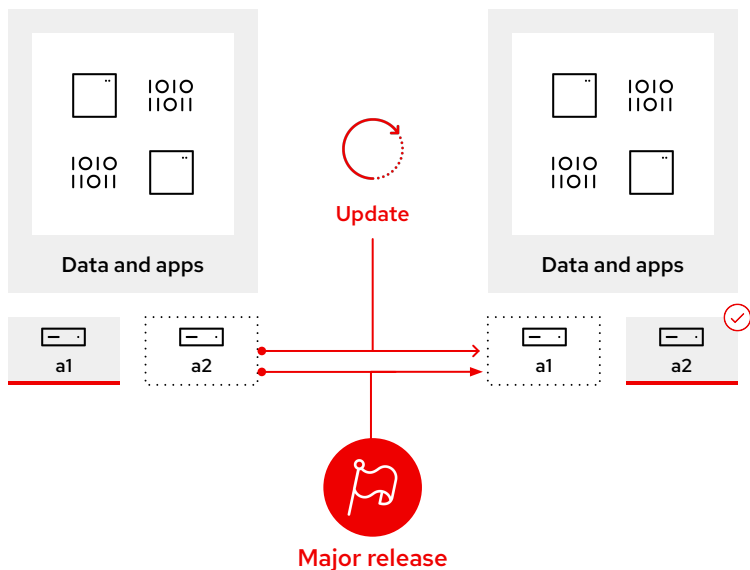


Intelligent rollbacks

Application-specific health checks detect conflicts and automatically reverts to last working OS update, preventing unplanned downtime.

rpm-ostree

Immutable OS and stateful config and storage

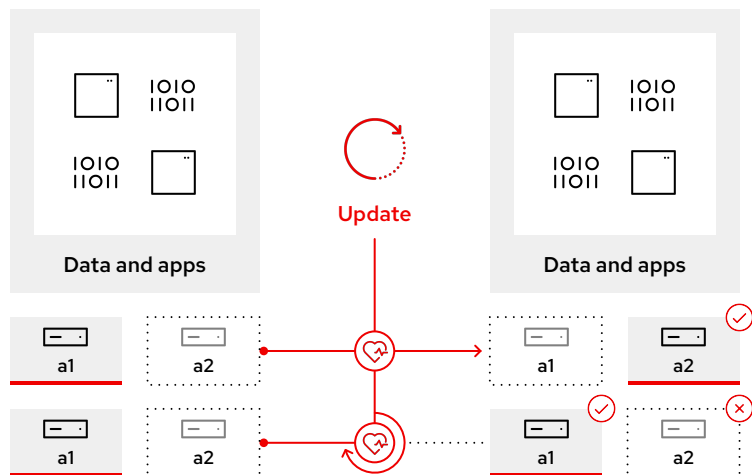


Transactional updates (A → B model)

- ▶ OS binaries and libraries (`/usr*`) are immutable and read-only.
- ▶ State (r/w) is maintained in `/var` and `/etc`.
- ▶ No inbetween state during updates.
- ▶ Updates are staged in the background and applied upon reboot.
- ▶ Reboots can be scheduled with maintenance windows to ensure the highest possible uptime.

Intelligent rollbacks: Greenboot

Additional safeguard for application and OS compatibility

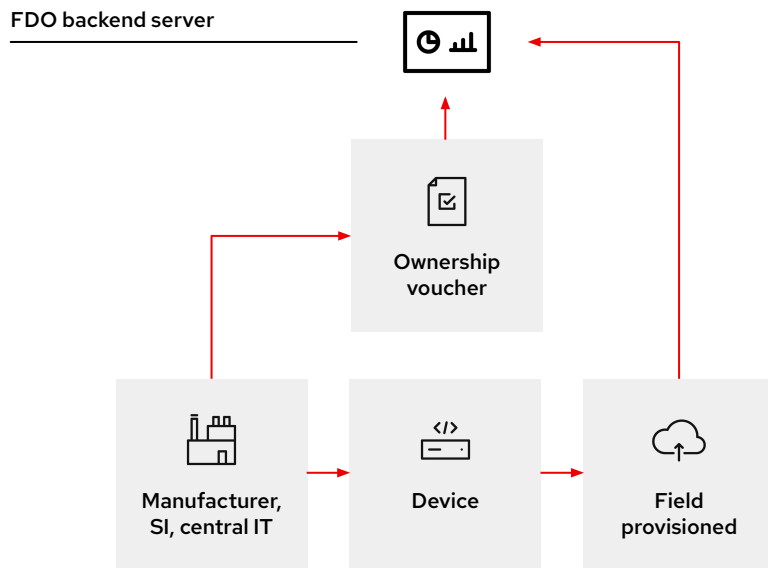


Custom health checks can determine if nodes are functioning properly

- ▶ Health checks are run during the boot process.
- ▶ If checks fail, a counter will track the number of attempts.
- ▶ In a failure state, the node will use rpm-ostree to rollback the update.
- ▶ Examples can include:
 - Basic name resolution
 - Service or container status or health

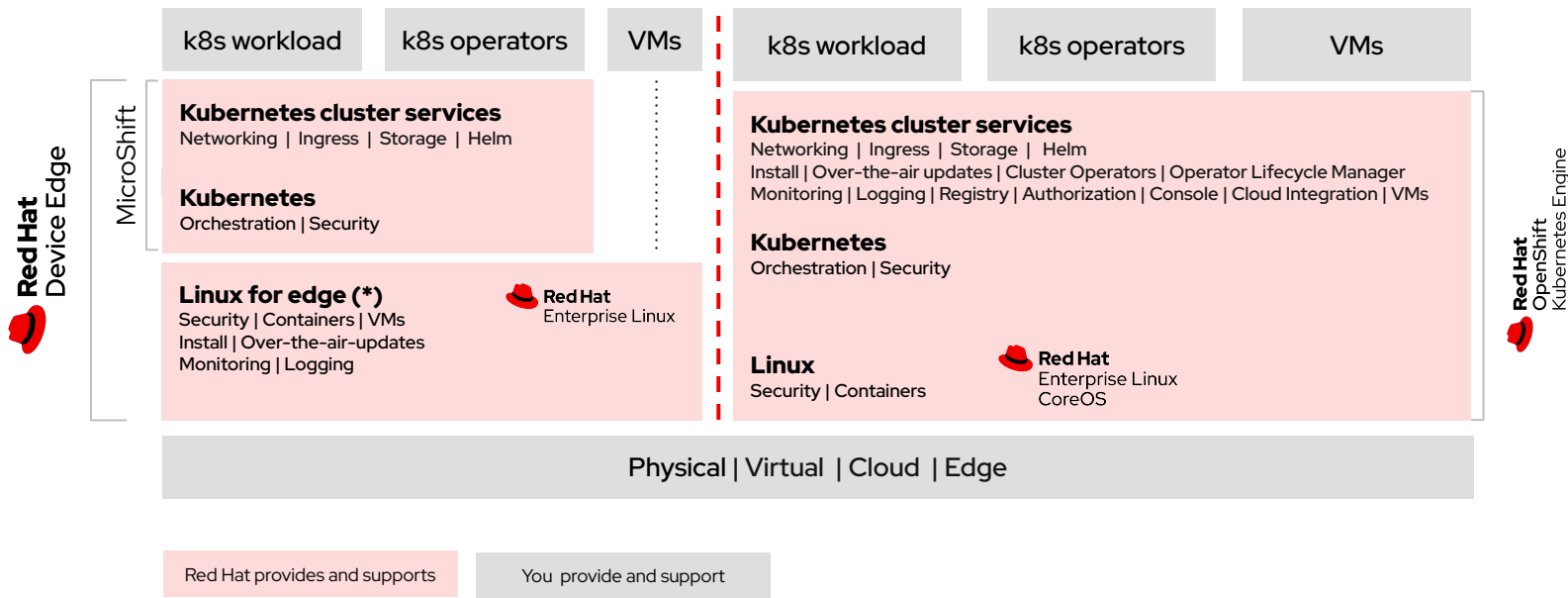
FIDO device onboard (FDO)

Securing and simplifying device enrollment



- ▶ Solves the problem of “late binding” devices to a management platform or to load other instructions/secrets.
- ▶ Cryptographically identifies the system identity and ownership before enrolling and passing configuration and other secrets.
- ▶ Enables non-technical users to power on the system and walk away.
- ▶ Available in Red Hat Enterprise Linux 9.0 and 8.6.

Device Edge with MicroShift compared to Openshift



Demo Time



Thank you

Red Hat is the world's leading provider of enterprise open source software solutions. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500.



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