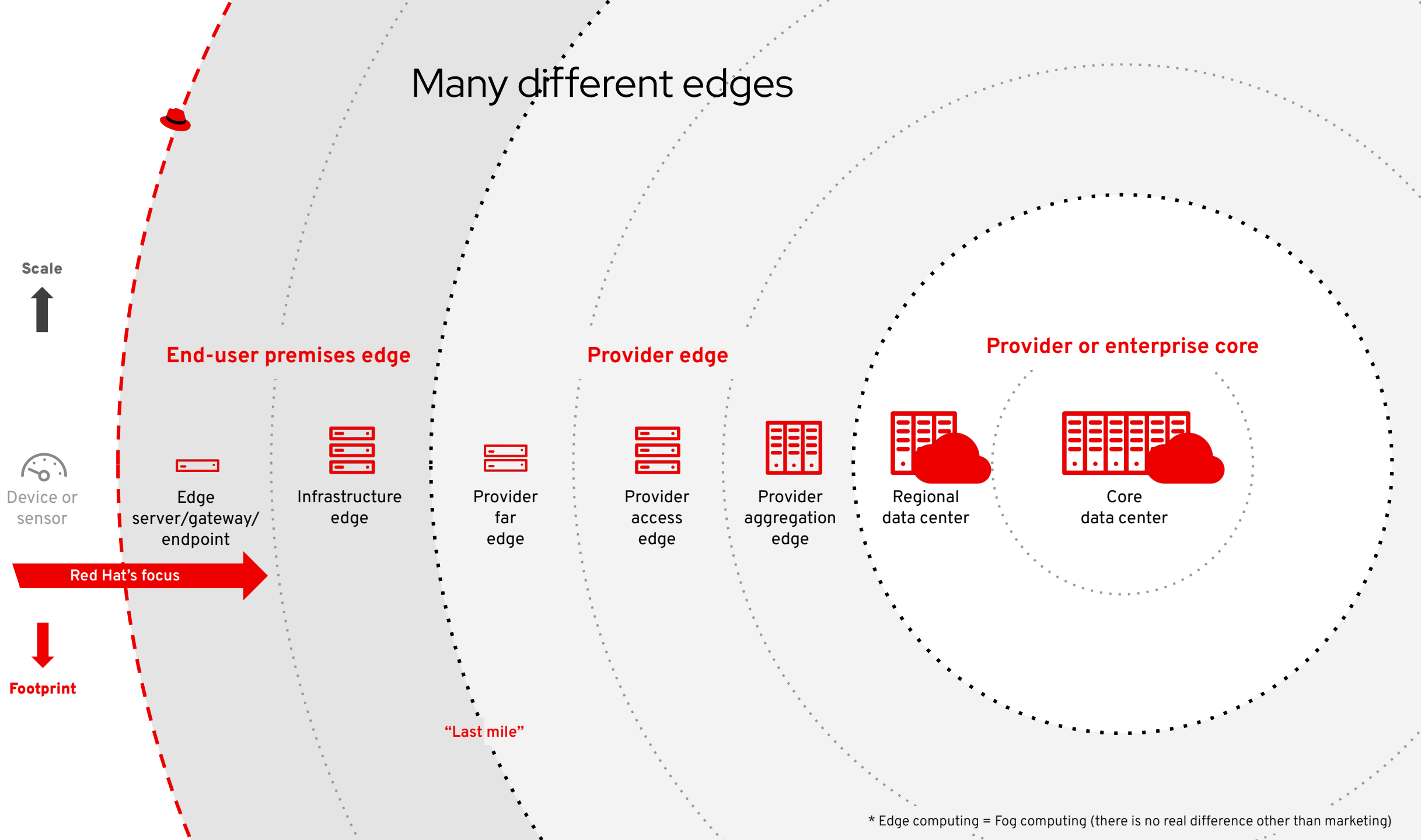


Red Hat Validated Patterns

Making complex examples, consistent and easily reproducible

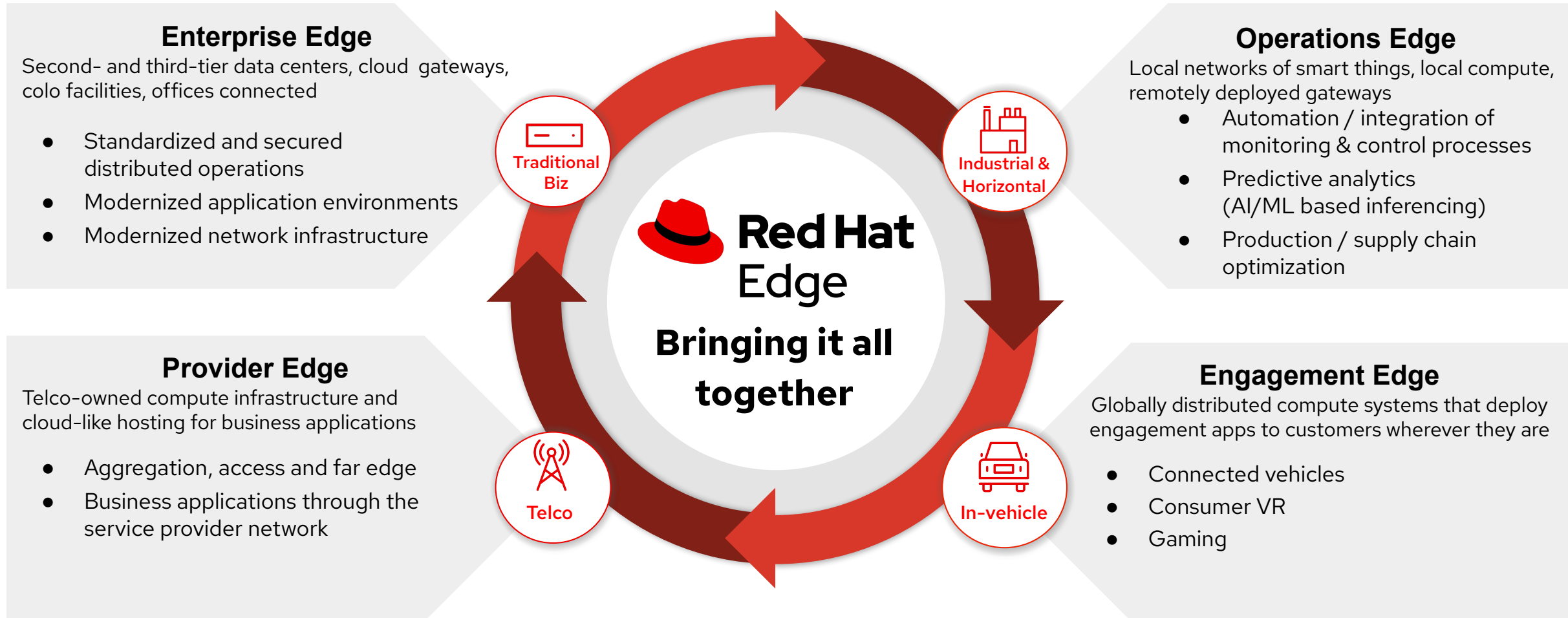
Anthony Herr
CTO Organization
Product Manager

Many different edges



* Edge computing = Fog computing (there is no real difference other than marketing)

What "Edge" is and Where we Play



Validated Patterns : Simplifying the creation of use cases

Bringing the Red Hat portfolio and ecosystem together - from services to the infrastructure

Configuration as code

Go beyond documentation using GitOps process to simplify deployment

From POC to production

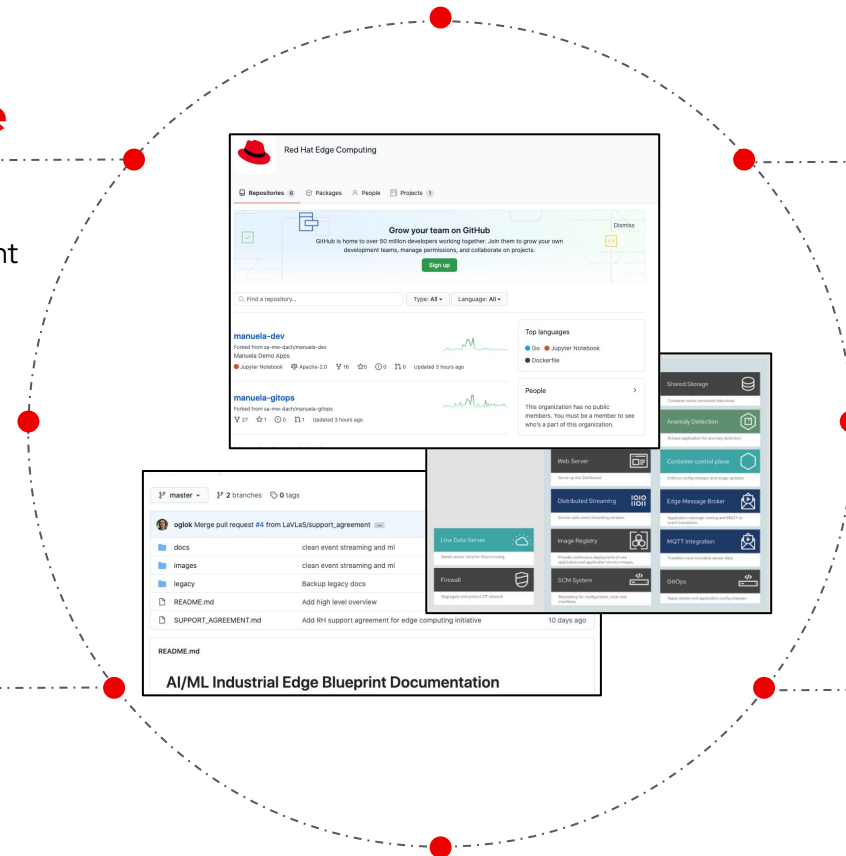
Ensure your teams are ready to operate at scale

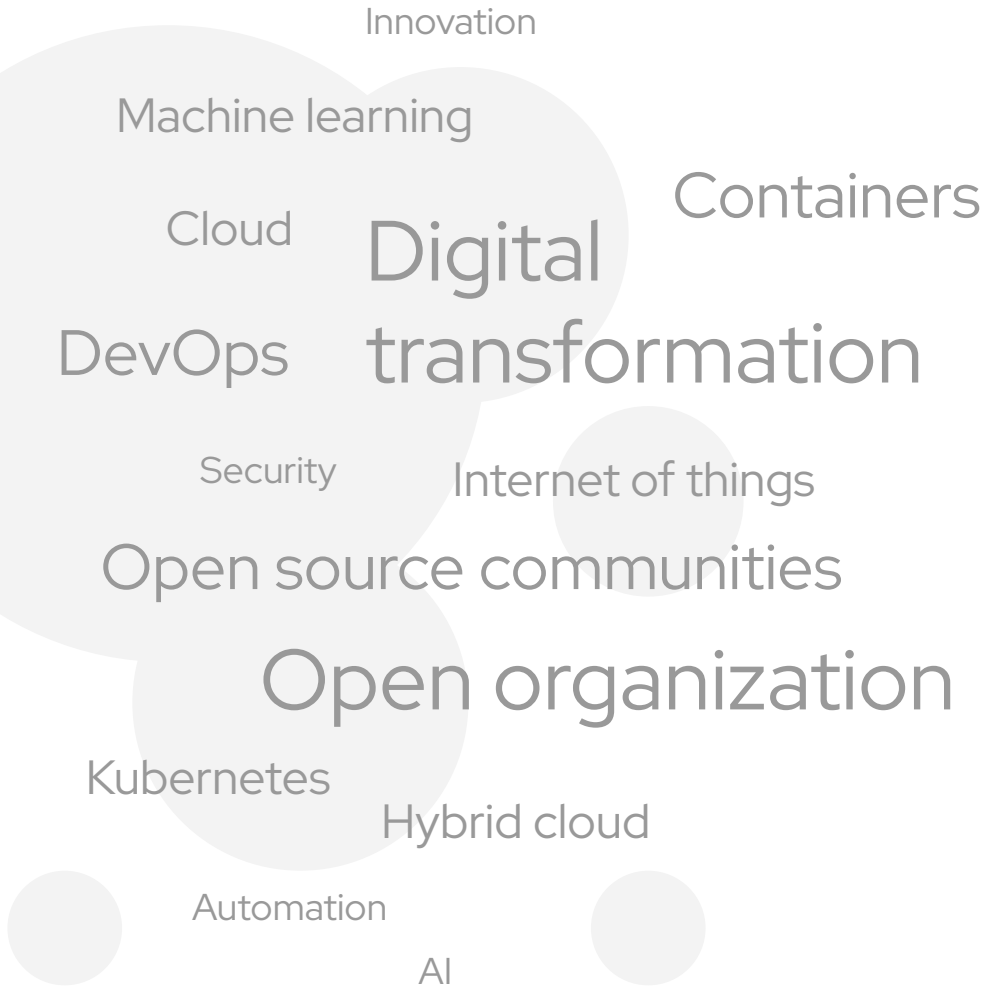
Highly reproducible

So that you can scale out your deployments with consistency

Open for collaboration

Anyone can suggest improvements and contribute to it





Business goals

.....

Reduce Complexity

Streamline Deployment

Tested Configurations

Use Case Building Blocks

Focus is on solving complex business problems



Faster Decision Making

Leverage data and analytics on-site to accelerate decisions



Enhanced End User Experience

Provide enhanced services to consumers and stakeholders outside of the office or data center



Remote Operations

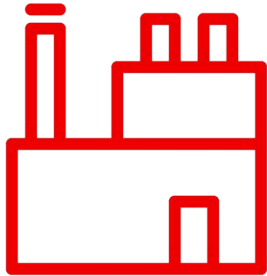
Ensure critical operations continue despite limited connectivity



Data & Compliance

Process and manage sensitive data on-site and maintain regulatory compliance

Validated Patterns Library



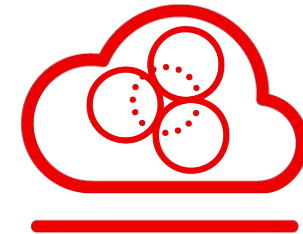
Industrial edge

Defect Detection using local input on a manufacturing production line



Medical diagnostics

Using medical images and AI/ML to provide guidance to doctors for improved diagnosis

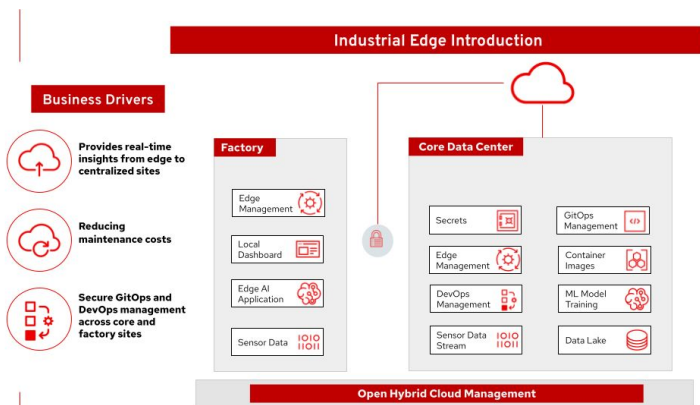


Multi-cloud GitOps

Showcasing the gitops deployment model over multiple sites for a streamlined customer experience

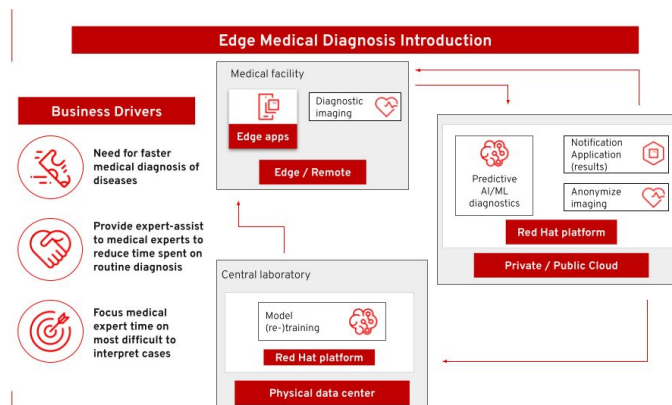
red.ht/patterns

Validated Patterns Library



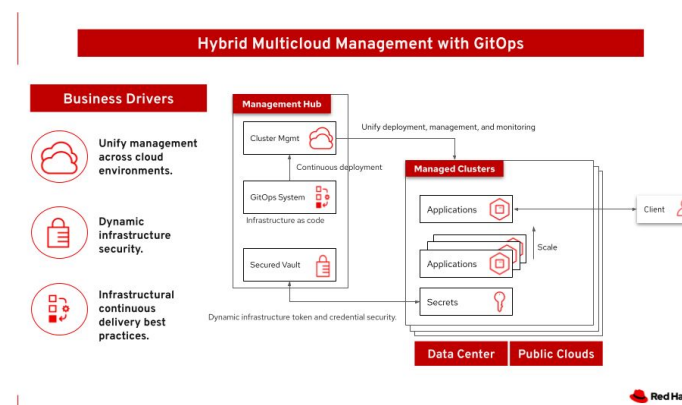
Industrial edge

Taking streaming input from a sensor and through an AI model determining defect detection



Medical diagnostics

Using static images pushed through an AI model to do pattern matching



Multi-cloud GitOps

Using GitOps for infrastructure as code to provide cross cluster governance and application lifecycle management using secure configuration and credentials

<https://www.redhat.com/architect/portfolio>

Industrial Edge

Business Needs

Accelerate software driven optimizations

- Reduce the time from issue to remediation
- Auditable release deployments to the factory

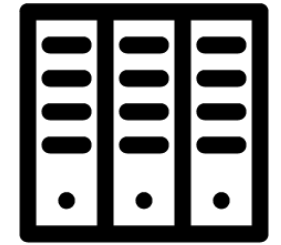
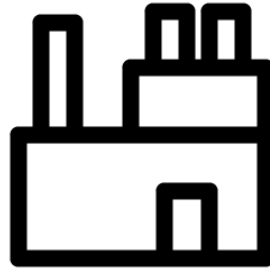
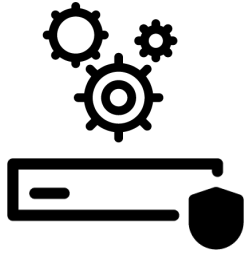
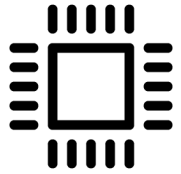
Declarative Configuration Management

- Agile controlled configuration rollout
- Define and enforce desired state
- Scale to hundreds of production lines

Real-time transparency

- Actionable production insights and notification
- Utilize AI to assess the state of the manufacturing process while it is running





Location &
Function
Protocols
of
devices

Device
Actuator, Sensor
PLC
~100,000

Line Server
Ruggedized Industry
PC, PLC, HMI, SCADA
~1,000

Plant Data Center
Racks in IT room
SCADA, PPS, MES,
PLM
~100

Regional Data Center
Country Specific
PPS, MES, PLM, ERP
~20-50

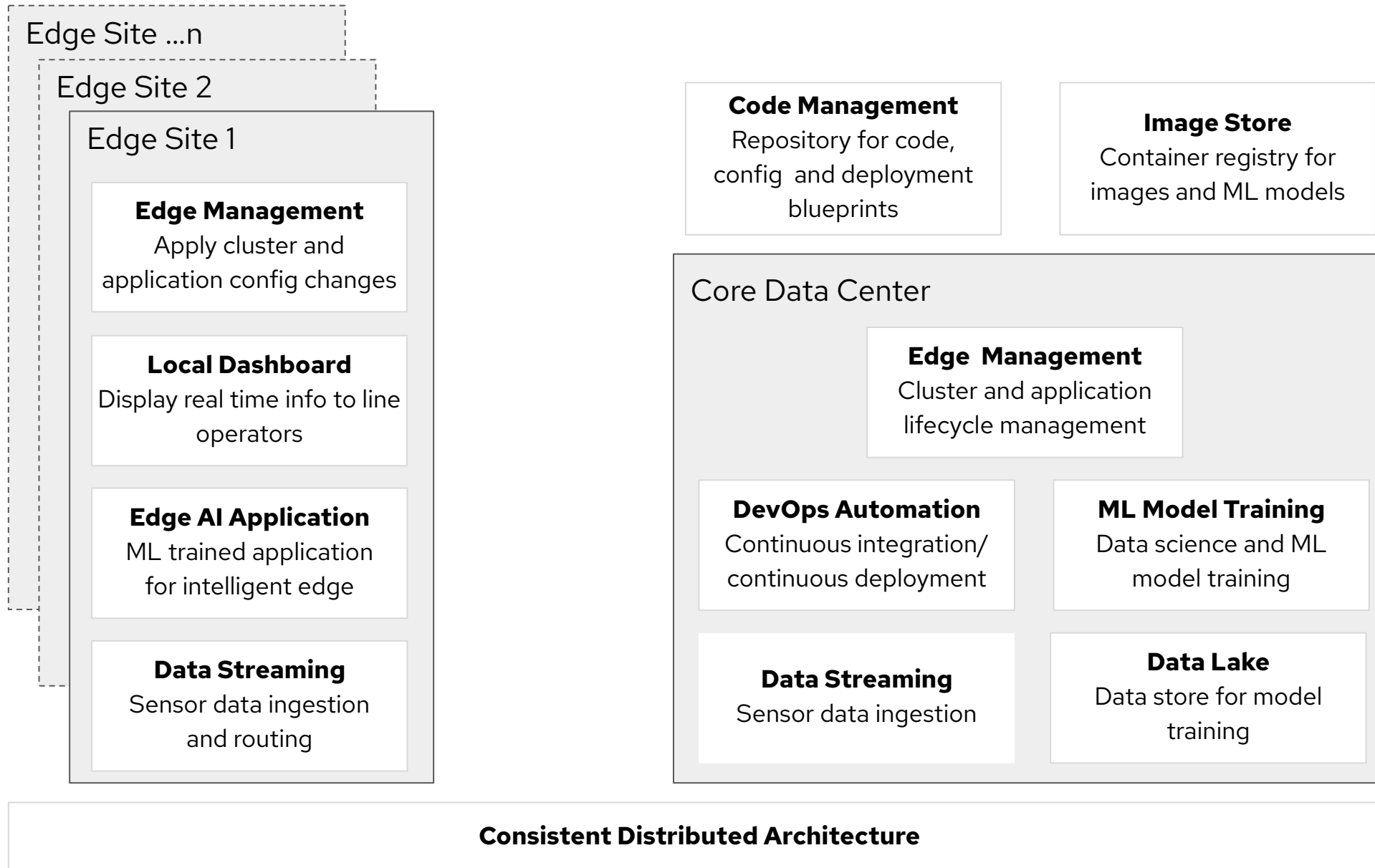
Headquarter Data Center
MES, PLM, ERP
~1-3

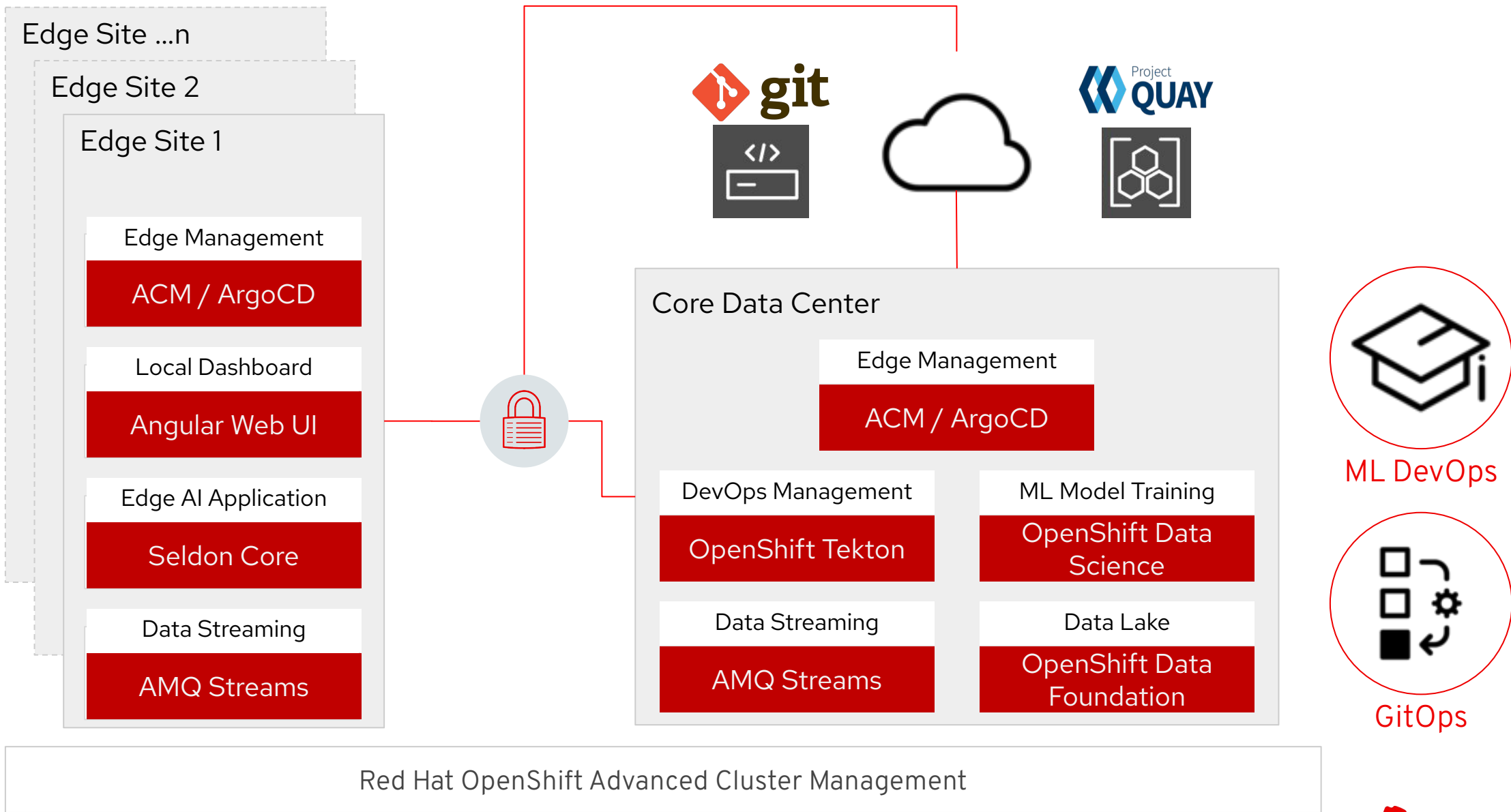
Operational Technology (OT)

Information Technology (IT)

EDGE

CORE





Medical Diagnosis

Business Needs

Faster Disease Diagnosis

- Accelerate time from patient's x-ray to diagnosis

Focus Practitioner Time

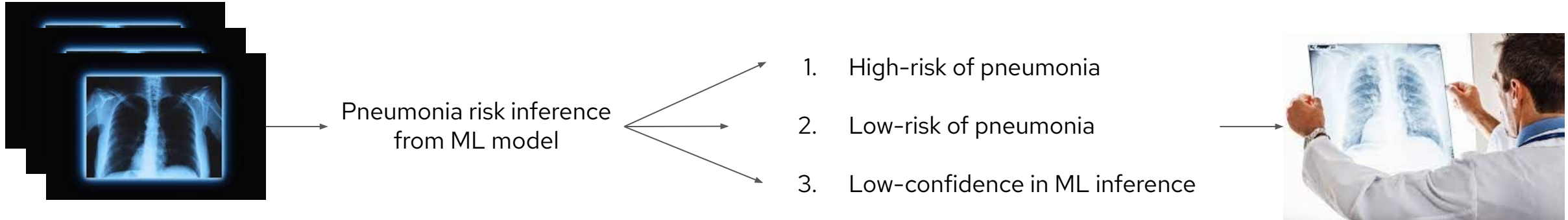
- Automatically categorize into high/low/unknown-probability
- Reduction in time spent on routine diagnosis

Accommodate Current Staffing Shortages

- Allow doctors to focus on more complex medical issues while providing the same level of service
- Reduce time for a patient to receive critical care

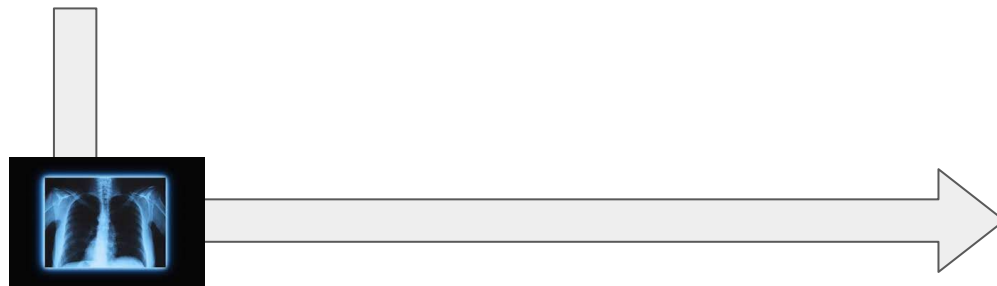


Solution Pattern - Primary Data Pipeline



At each medical facility (on-demand):

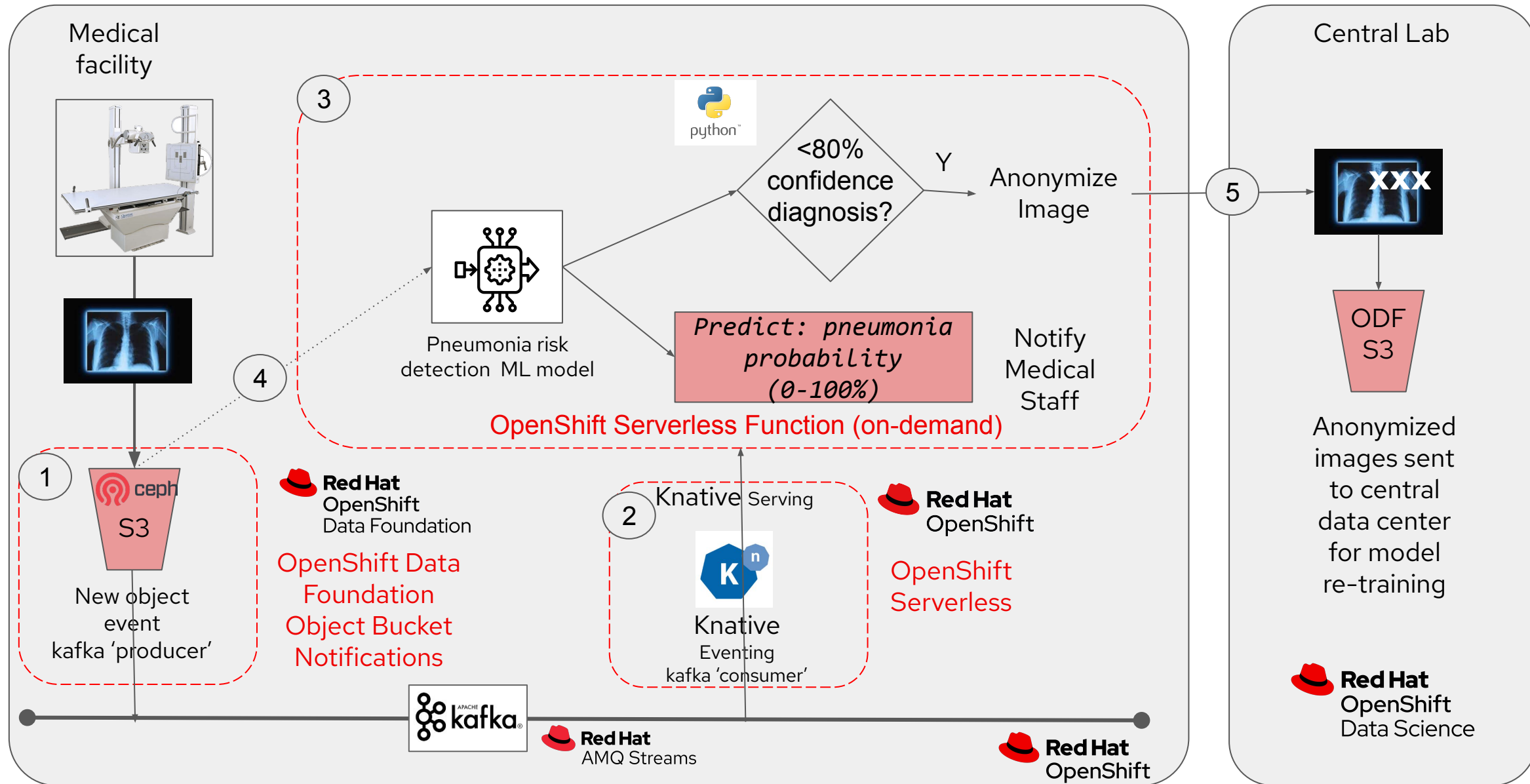
1. Automatically categorize x-rays into high/low/unknown risk of pneumonia.
2. Notify medical practitioners in real-time about high-risk pneumonia patients.
3. Submit all x-ray categorization results for human review and approval.
4. **Anonymize** x-rays with low-confidence ML inference results and send to data center for model retraining, **with no PII**.



At central lab (batch):

1. Retrain pneumonia risk detection ML model for improved accuracy.
2. Report on trend analysis of ML pneumonia risk prediction accuracy.

Pipeline Architecture



Validated Patterns Interoperability

Vertical Markets

Logistics



Package Scanning

Healthcare



Security

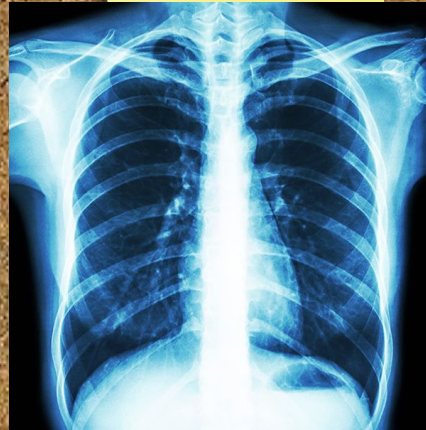
Airport Passenger Screening

X-Ray Pneumonia



Retail

Purchase Verification



Defense

Satellite Ship Detection

For more information:



Git Repos::

- <https://github.com/hybrid-cloud-patterns>
- <https://github.com/redhat-edge-computing>

Web Pages:

- red.ht/patterns → Red Hat Site
- <https://redhat-gitops-patterns.io/> → Validated Patterns
- <http://hybrid-cloud-patterns.io/> → Community Patterns for everyone to contribute and work together
- <https://www.redhat.com/architect/portfolio> → Portfolio Architecture page

Blogs: (Based on Industrial Edge Validated Pattern)

- <https://www.redhat.com/en/resources/manufacturers-scale-edge-computing-hybrid-cloud-overview>
- <https://www.redhat.com/en/resources/validated-patterns-industrial-edge-overview>

DevConf 2022:

- Pattern demo: https://www.youtube.com/watch?v=yQ_Y0uQsCMc
- Pattern discussion: <https://www.youtube.com/watch?v=uxEanR7sUrY>

Red Hat Summit 2022:

- From a working concept to a validated pattern: [Lifesaving technology in an open source framework](#)

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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