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Telco as an Enabler for Edge Computing

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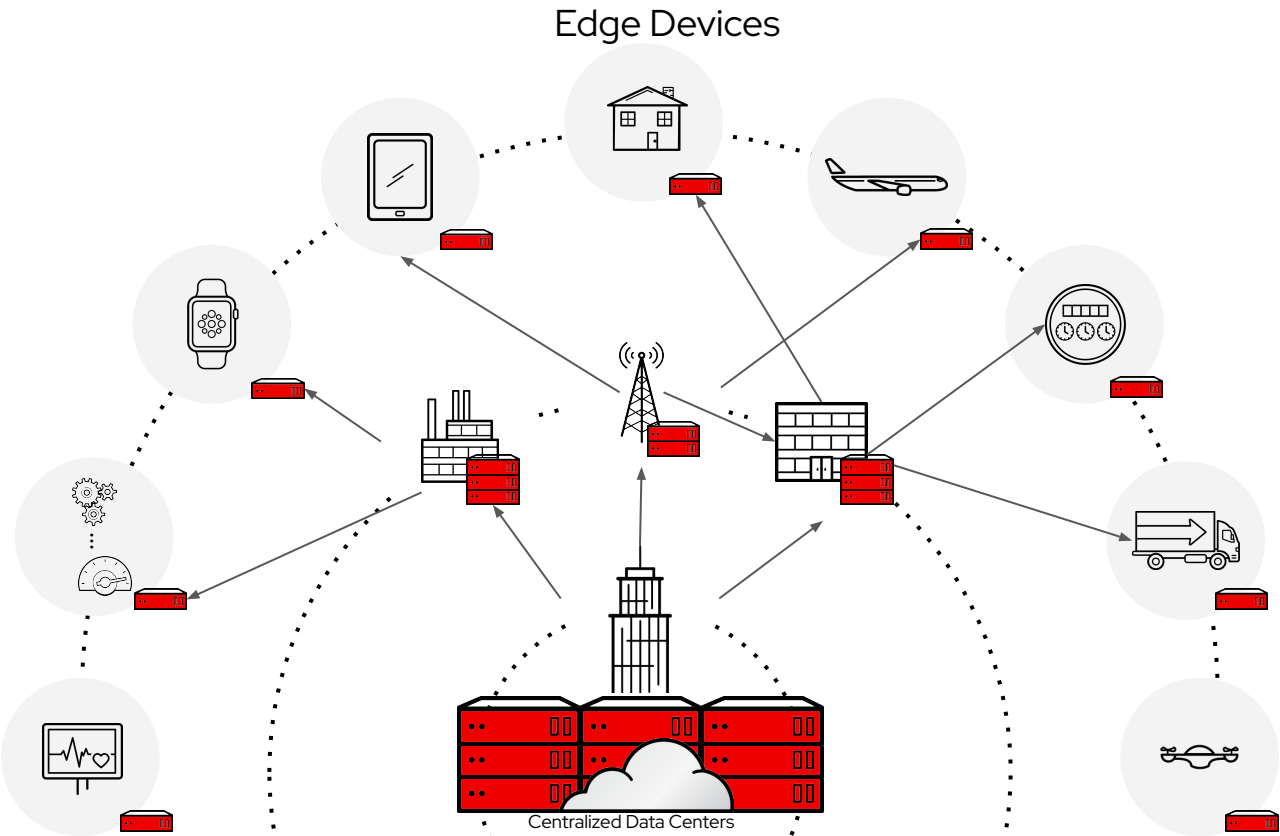
October, 2023



What we'll discuss today

- **What and Why of Edge Computing**
- **5G & Multi Access Edge Computing (MEC)**
- **Role of Telecommunications in Edge**
- **Edge-as-a-Service**
- **Summary**

What is Edge Computing



Edge Computing (vs Cloud Computing)

Two competing trends.



WHAT IS THE EDGE

Edge Tiers

SCALE



Device or Sensor



FOOTPRINT

Device Edge



Edge Server/Gateway

End-User Premises Edge



Infrastructure Edge



Far Edge

Provider Edge



Access Edge

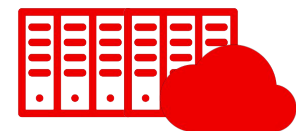


Aggregation Edge

Provider/Enterprise Core



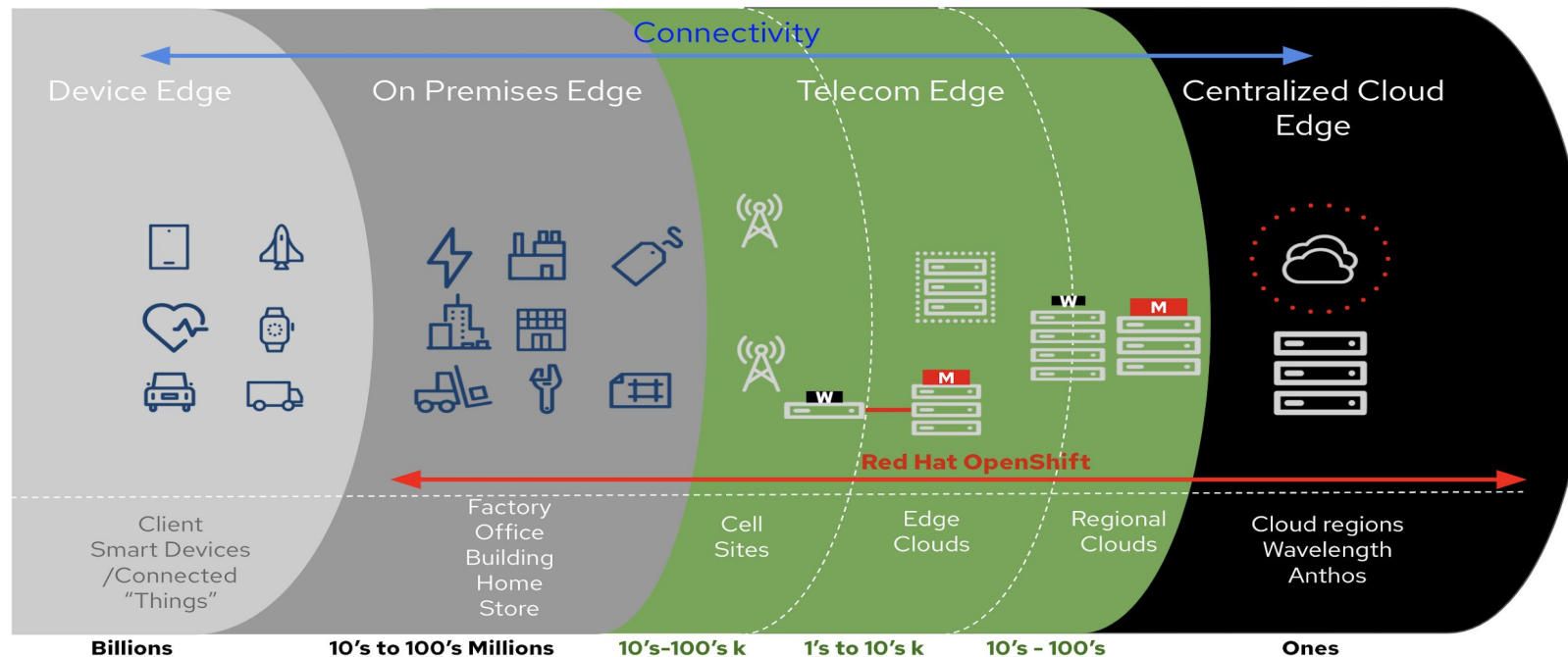
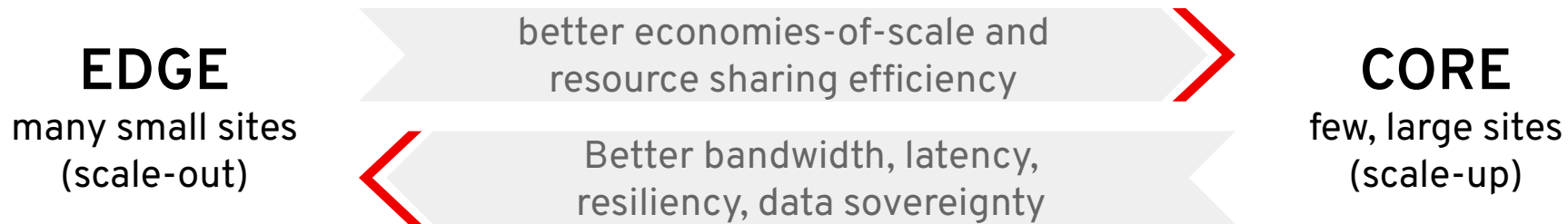
Regional Data Center



Core Data Center

"last mile"

Multi-Access Edge Computing with 5G



“Centralize where you can,
distribute where you must.”

Who Is Doing Edge Computing?



Enterprise

(Retail) Remote office

In-field operations

and more...



Telco

Radio Access Network

Multi access edge computing

Private 5G

and more...



Public sector

Connected sensors and controllers

Universal customer premise equipment

and more...



Artificial intelligence/ Machine learning

Video surveillance

Connected car, train, plane

and more...



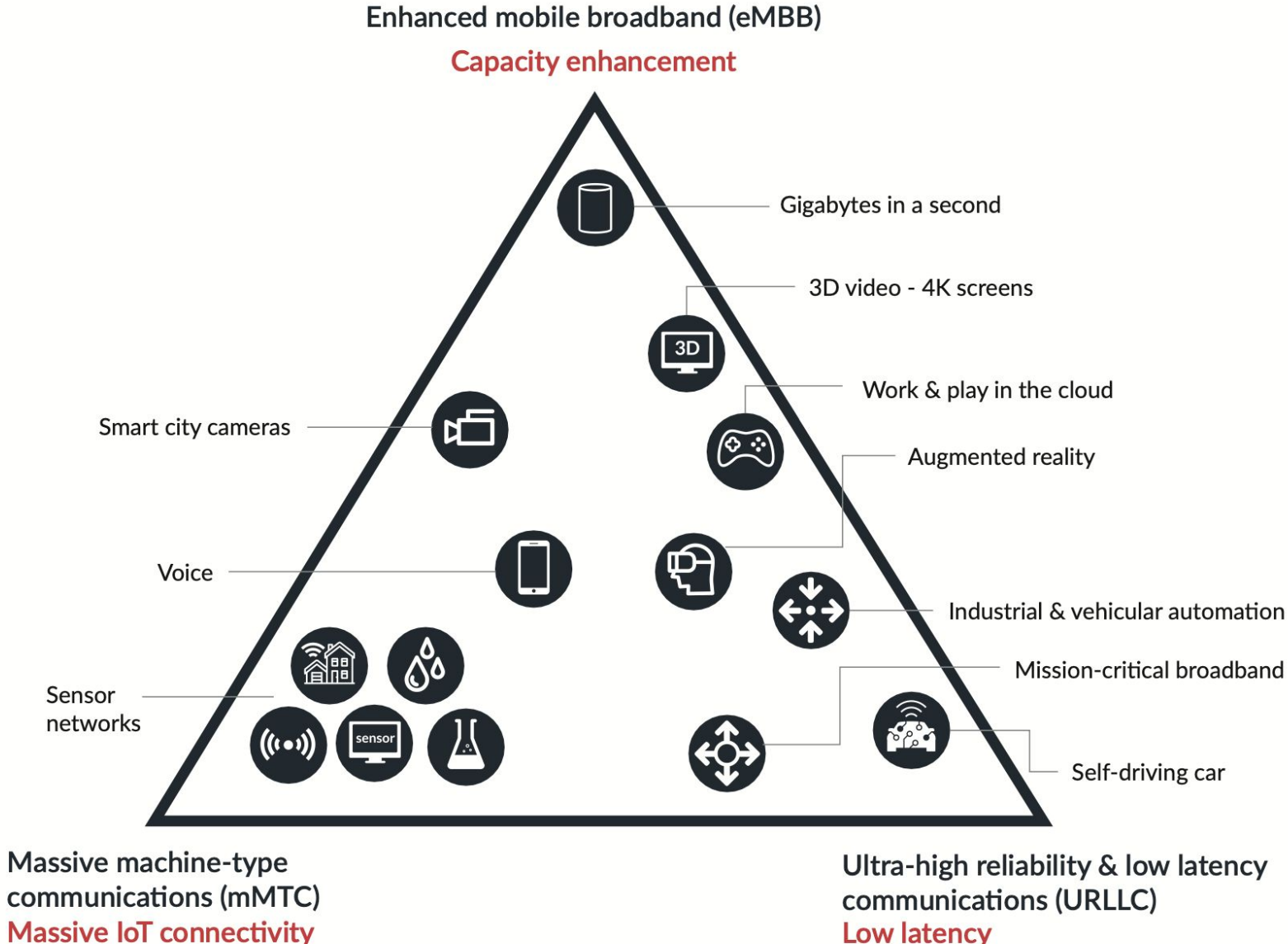
Internet of Things

Trading sensitive apps

Healthcare monitoring and data processing

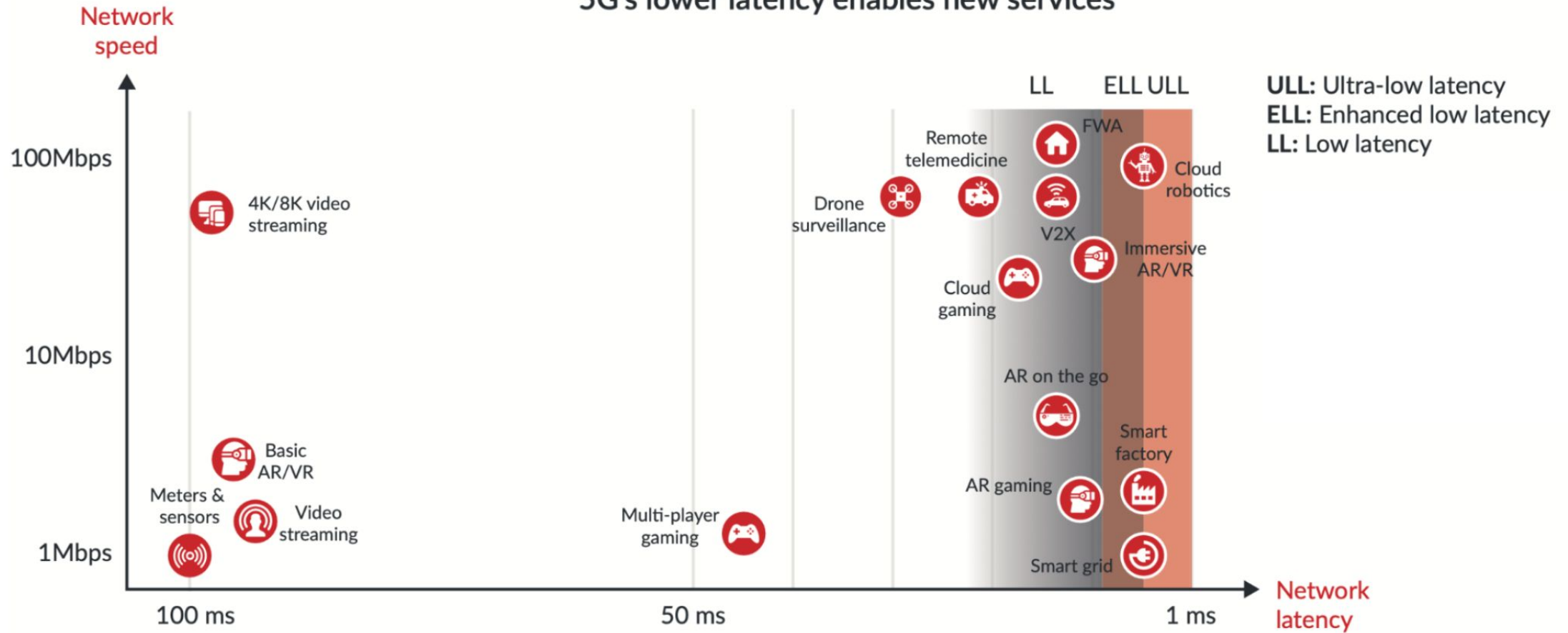
and more...

Use cases for 5G

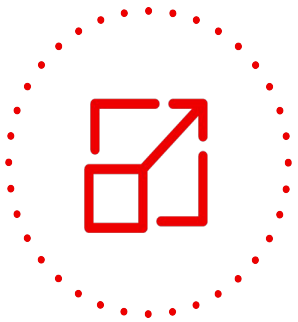


Use cases for 5G

5G's lower latency enables new services

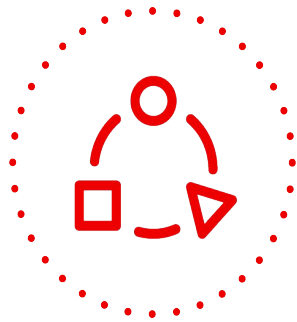


The complexities of edge computing



Scale

Need to manage up to hundreds of thousands nodes and clusters remotely



Interoperability

Ensure support for a heterogenous hardware and software environments



Consistency

Provide a consistent approach for developer and IT operations teams



Security

Provide a Streamlined security posture at every steps in the devSecOps chain

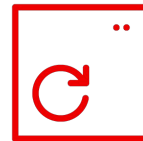
Why containers make sense at the edge



New applications



Run anywhere



Update at scale



Lightweight

New applications using AI/ML technology or that offer deeper customer engagements such as AR/VR are containerized

Containerized applications are portable so that they can be deployed and lifecycle managed consistently across an architecture

New management models (like gitOps) allow developers to frequently update applications at remote sites - as if they were in a local data center

Can be deployed to any device and require a smaller resource footprint for physically smaller edge environments

Device Edge platform

RHEL minimal profile and tooling for Edge devices + MicroShift

10⁴ devices



Red Hat Device Edge

Single-node edge servers

Low bandwidth or disconnected sites

10⁴ servers



Red Hat OpenShift

(Remote) worker nodes

Space-constrained environments

10⁴ servers



10² clusters



3 node Clusters

Low footprint clusters with high availability



10² clusters



Minimum System Requirements (per node):

w/o k8s:
1 Core
2 GB RAM

with k8s:
2 Core
2GB RAM

Red Hat Management

4 Cores
16GB RAM

Worker:
1 Core
8 GB RAM

Control:
2 Core
16GB RAM

6 Cores
24GB RAM

Edge(s)

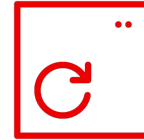
de-centralized DC

Cloud(s) or DC

Edge Computing as a Service (EaaS)



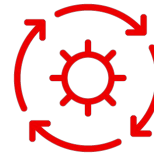
Instantiate on Demand



Launch at scale



Secured



Management and Automation

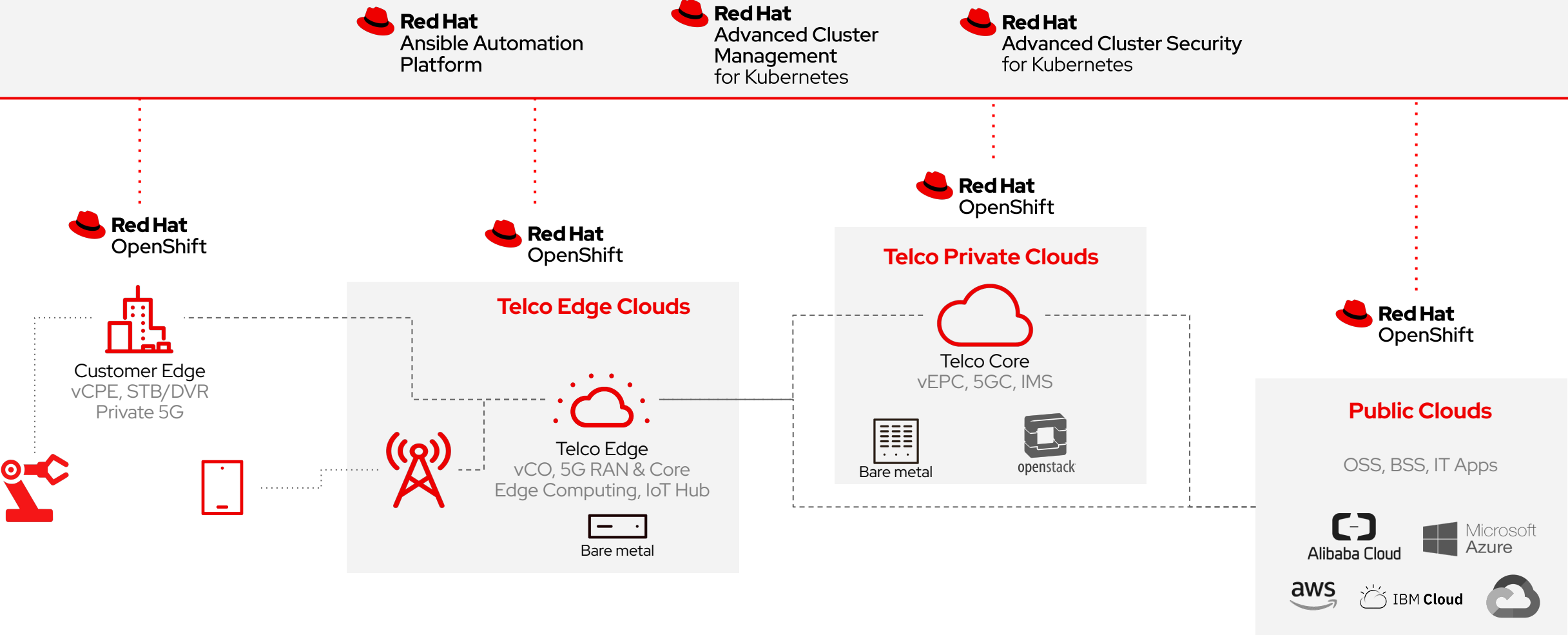


Observability



Multi tenant

Enabling a uniform telco horizontal cloud



Summary

- ▶ Edge computing is moving the **compute closer to the source of data generation** / end users.
- ▶ 5G, with capabilities like **URLLC**, **eMBB** & **mMTC**, is well suited to realize Edge use cases
- ▶ The architecture would be use case specific. But should be **cloud-native having uniform manageability at scale**
- ▶ Telcos have **major role** to play in use cases like **private 5G, EaaS, Enterprise Edge**, etc.

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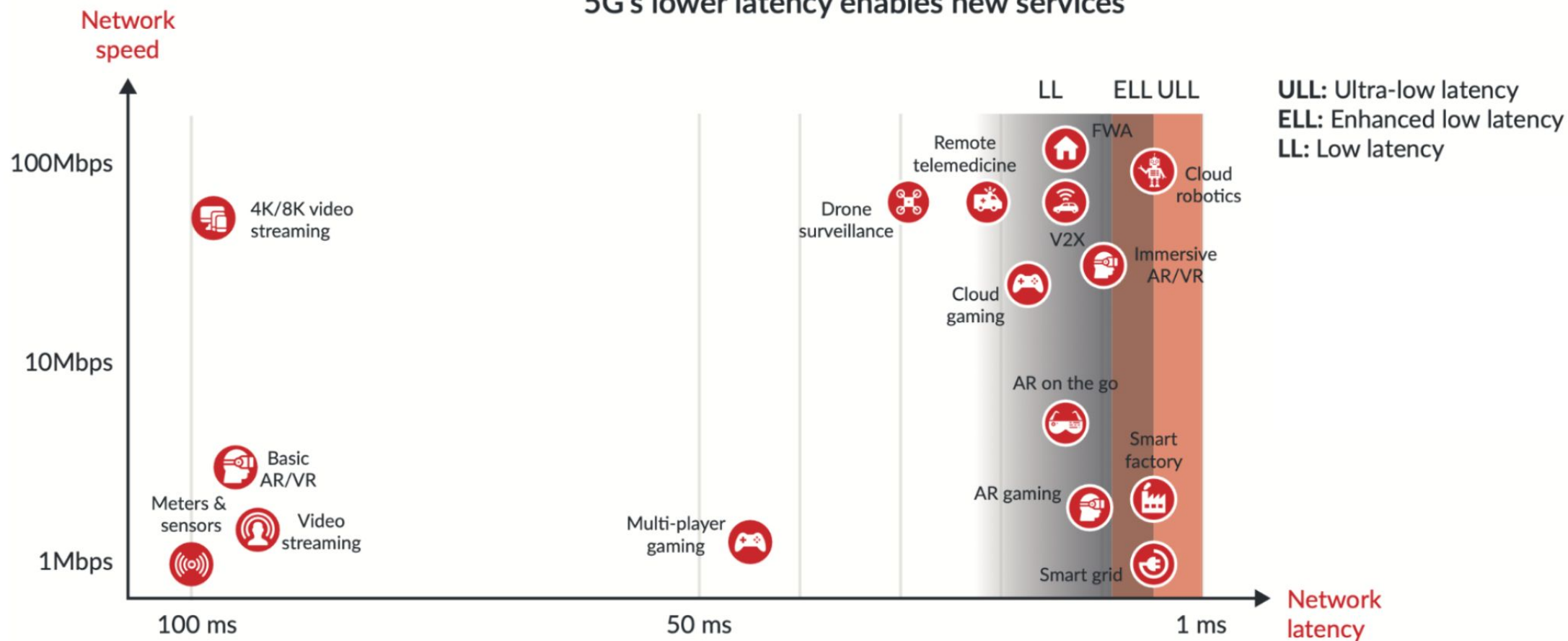
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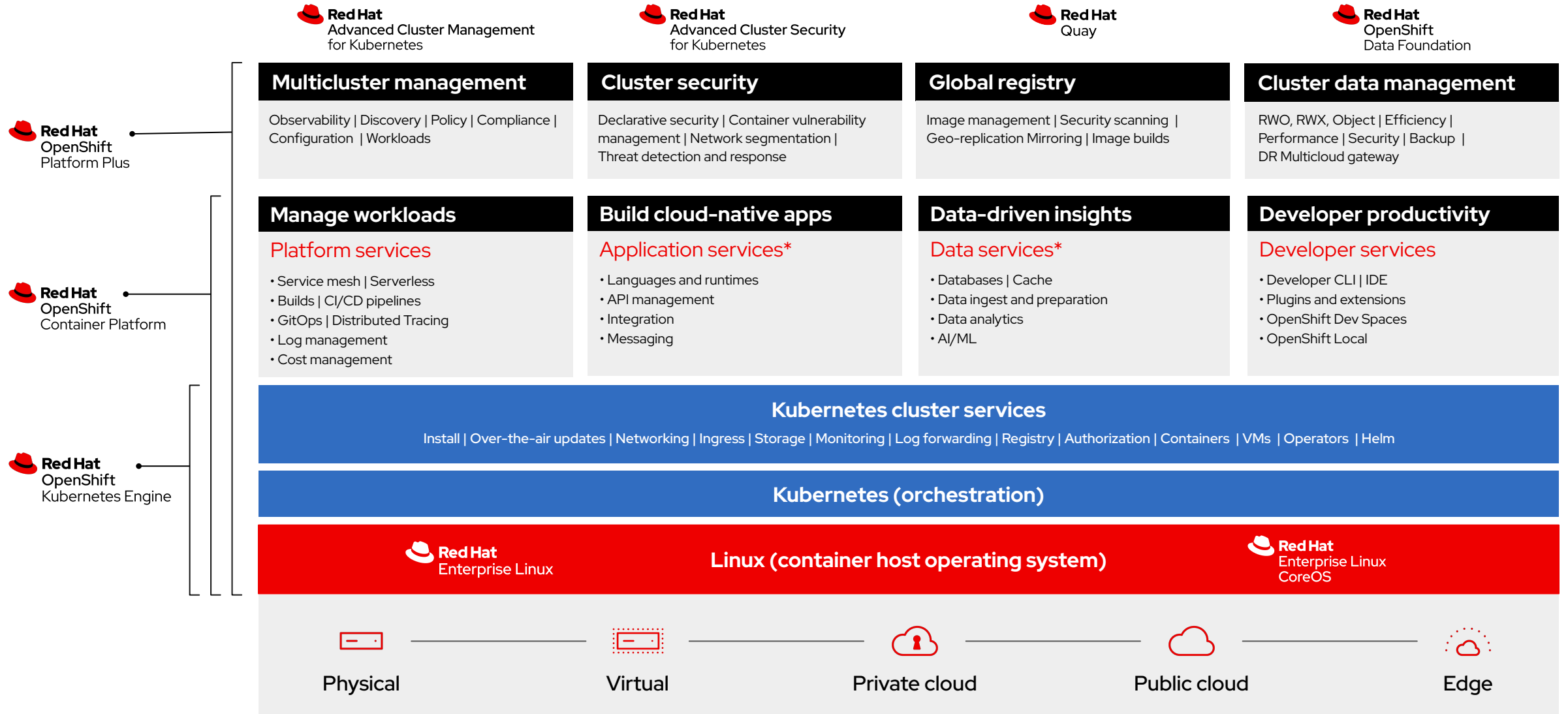
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Use cases for 5G

5G's lower latency enables new services



Red Hat open hybrid cloud platform



* Red Hat OpenShift® includes supported runtimes for popular languages/frameworks/databases. Additional capabilities listed are from the Red Hat Application Services and Red Hat Data Services portfolios.

** Disaster recovery, volume and multicloud encryption, key management service, and support for multiple clusters and off-cluster workloads requires OpenShift Data Foundation Advanced