



# PREPARING FOR 5G: DISTRIBUTED CLOUD INFRASTRUCTURE

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# READING MATERIAL

## ERICSSON WHITE PAPER

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# 5G SYSTEMS

### ENABLING THE TRANSFORMATION OF INDUSTRY AND SOCIETY

A digital transformation is taking place in almost every industry, disrupting and making us rethink our ways of working. Through an unprecedented ability to share information, people and industries are collaborating more, creating solutions that combine many different areas of expertise and overturning traditional business models. This cross-industry transformation has created a need to evolve wireless connectivity for the fifth generation of mobile technology. The goal is to expand the broadband capability of mobile networks, and to provide specific capabilities for consumers and for various industries and society at large unleashing the potential of the Internet of **Things**.

Use cases	Requirements	Desired value
Autonomous vehicle control	Latency	5ms
	Availability	99.999 percent
	Reliability	99.999 percent
Emergency communication	Availability	99.9 percent victim discovery rate
	Energy efficiency	One-week battery life
Factory cell automation	Latency	Down to below 1ms
	Reliability	Down to packet loss of less than $10^{-9}$
High-speed train	Traffic density	Downlink (DL): 100Gbps/km <sup>2</sup> , uplink (UL): 50 Gbps/km <sup>2</sup>
	User throughput	DL: 50Mbps, UL: 25Mbps
	Mobility	500kmph
	Latency	10ms
Large outdoor event	User throughput	30Mbps
	Traffic density	900Gbps/km <sup>2</sup>
	Connection density	Four devices/m <sup>2</sup>
	Reliability	Outage probability < 1 percent
Massive numbers of geographically dispersed devices	Connection density	1,000,000 devices/km <sup>2</sup>
	Availability	99.9 percent coverage
	Energy efficiency	10-year battery life
Media on demand	User throughput	15Mbps
	Latency	5s (start application), 200ms (after link interruptions)
	Connection density	4,000 devices/km <sup>2</sup>
	Traffic density	60Gbps/km <sup>2</sup>
	Availability	95 percent coverage
Remote surgery and examination	Latency	Down to 1ms
	Reliability	99.999 percent
Shopping mall	User throughput	DL: 300Mbps UL: 60Mbps
	Availability	95 percent for all applications, and 99 percent for safety-related applications

## DISTRIBUTED CLOUD INFRASTRUCTURE PAPER

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Strategic Portfolio Management PA Cloud Infrastructure



# DISTRIBUTED CLOUD INFRASTRUCTURE

# 5G – BEYOND MOBILE BROADBAND



BROADBAND EXPERIENCE  
EVERYWHERE, ANYTIME



MEDIA  
EVERYWHERE



SMART VEHICLES,  
TRANSPORT & INFRASTRUCTURE



CRITICAL CONTROL  
OF REMOTE DEVICES

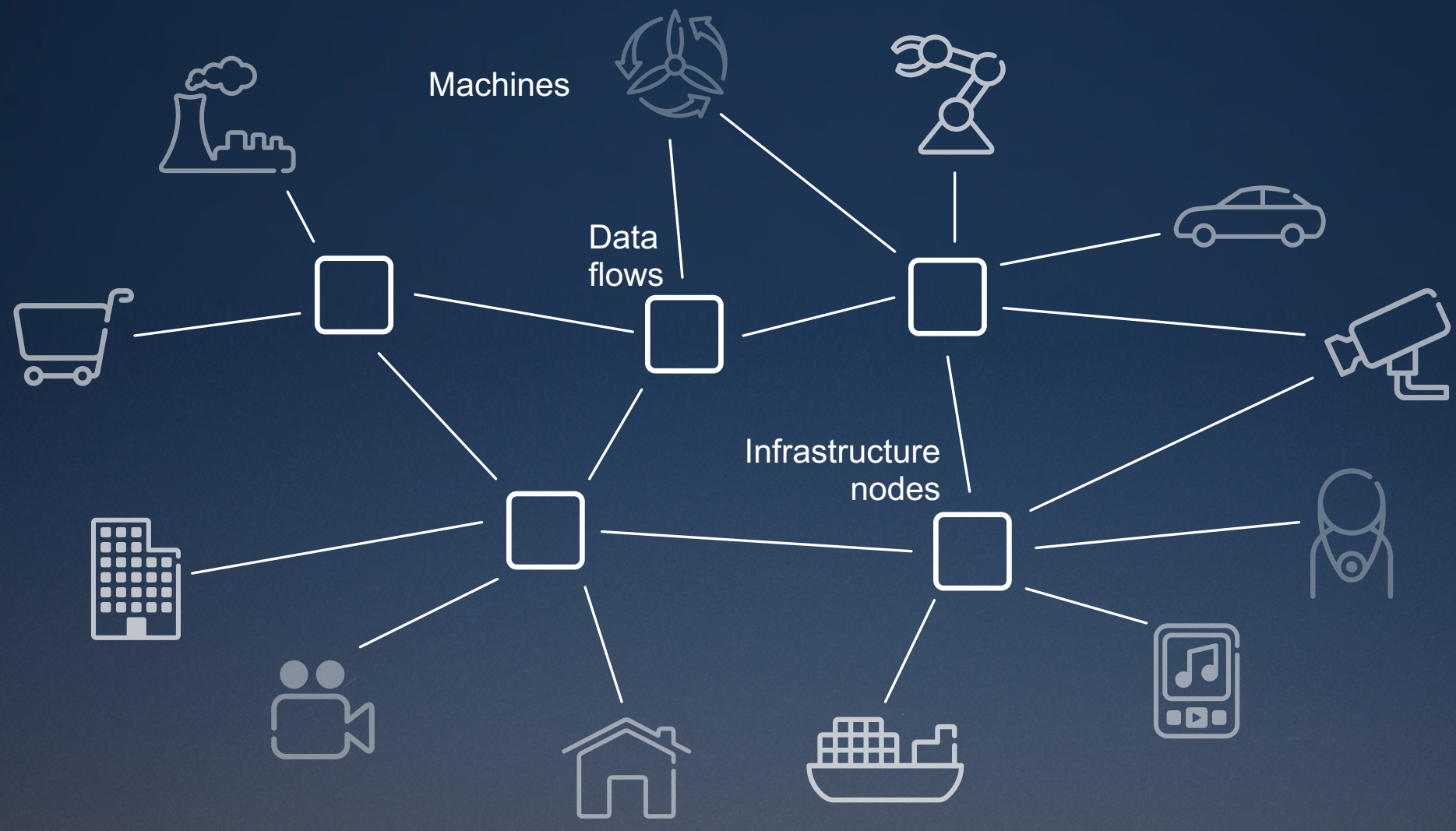


INTERACTION  
HUMAN-IOT

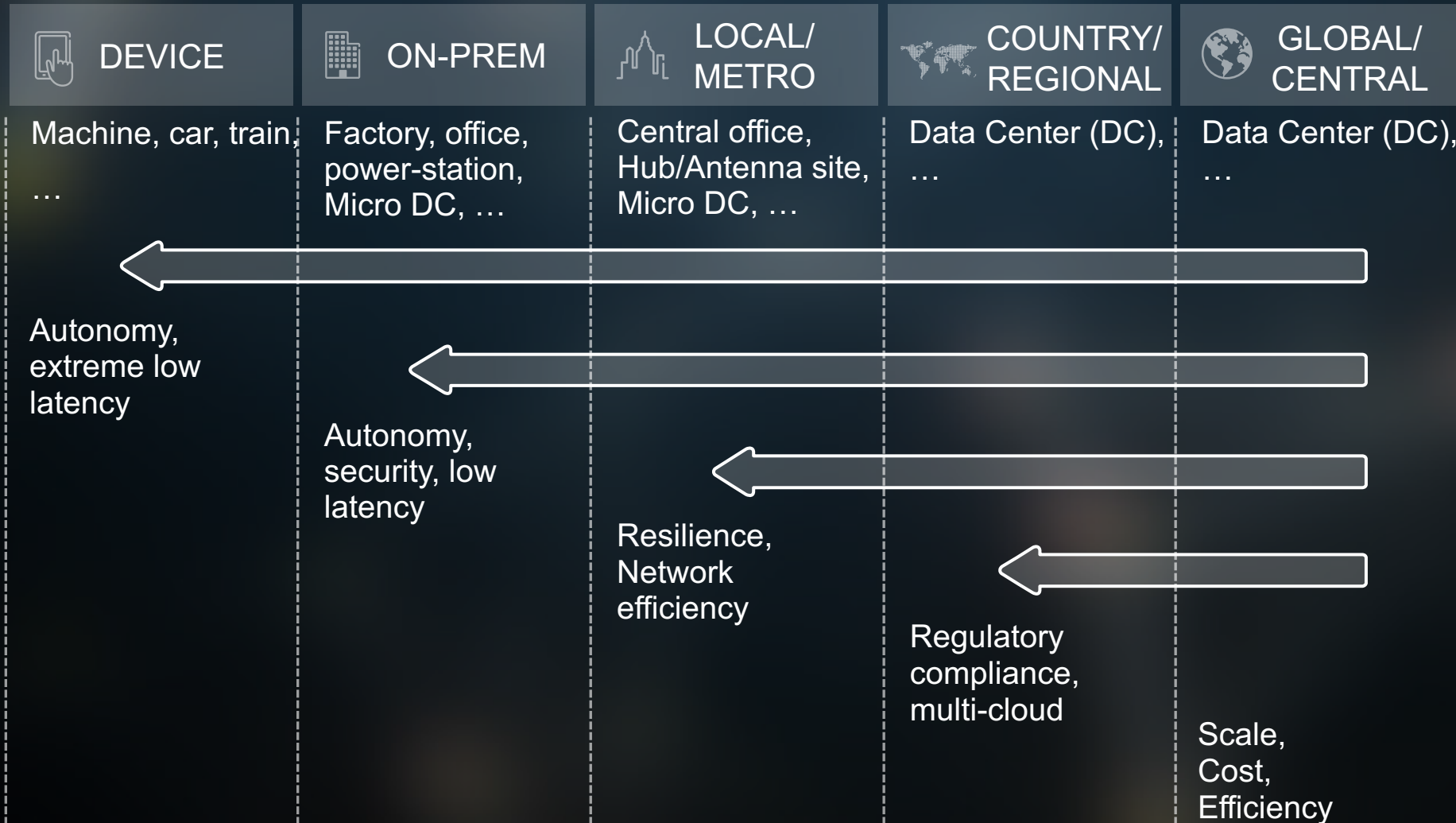


Wide range of new opportunities and use cases

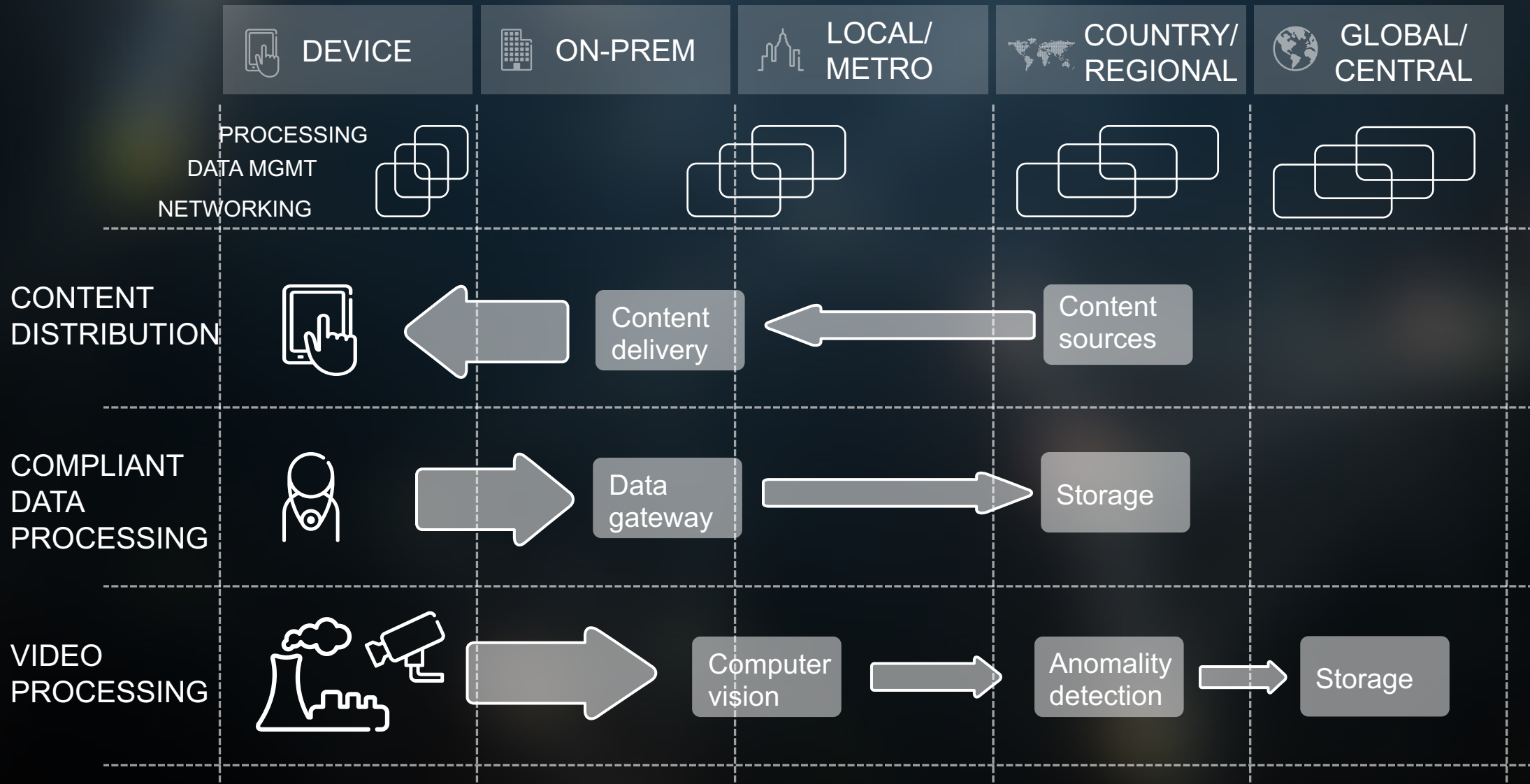
# DISTRIBUTED CLOUD INFRASTRUCTURE



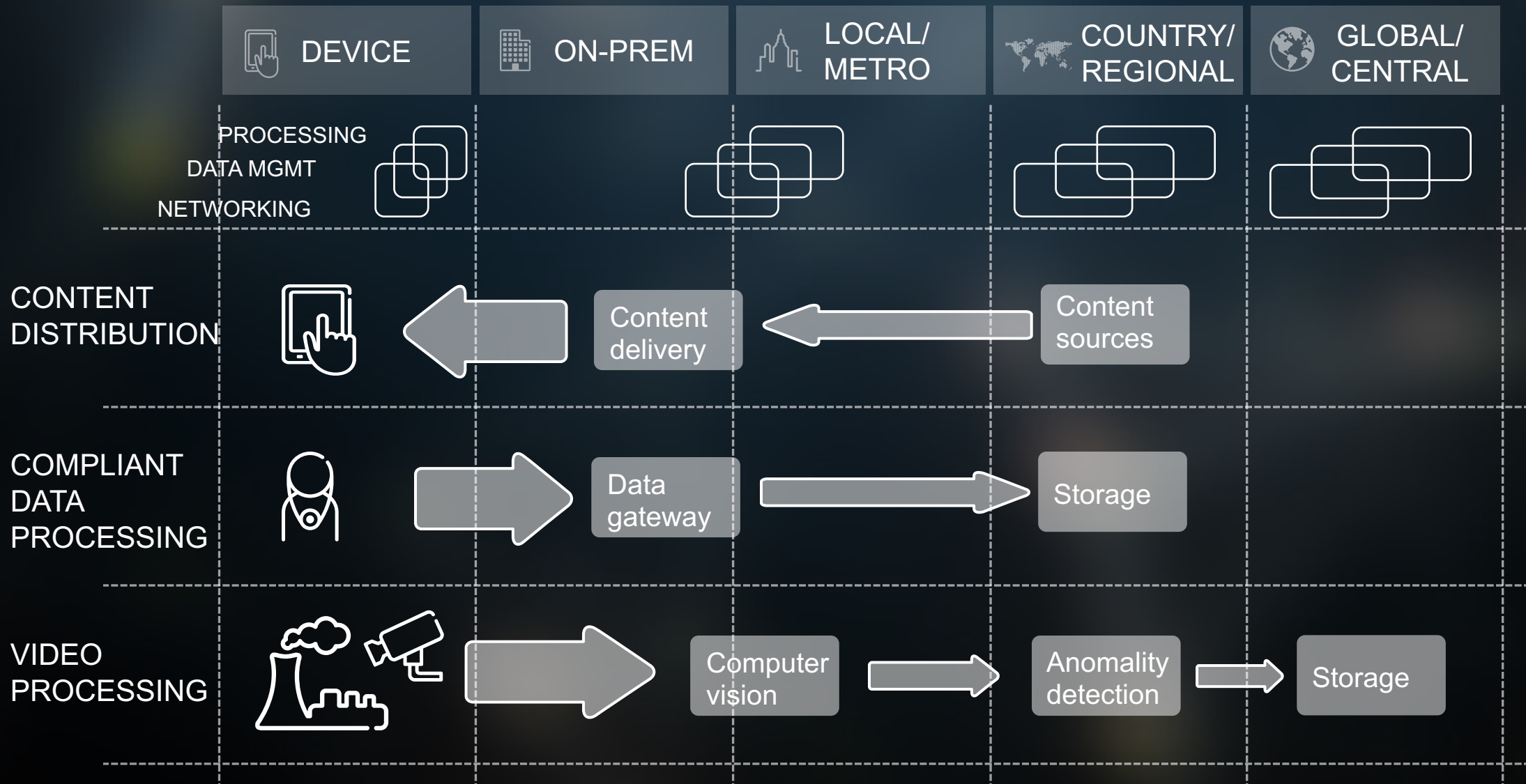
# DRIVING FORCES FOR DECENTRALIZATION



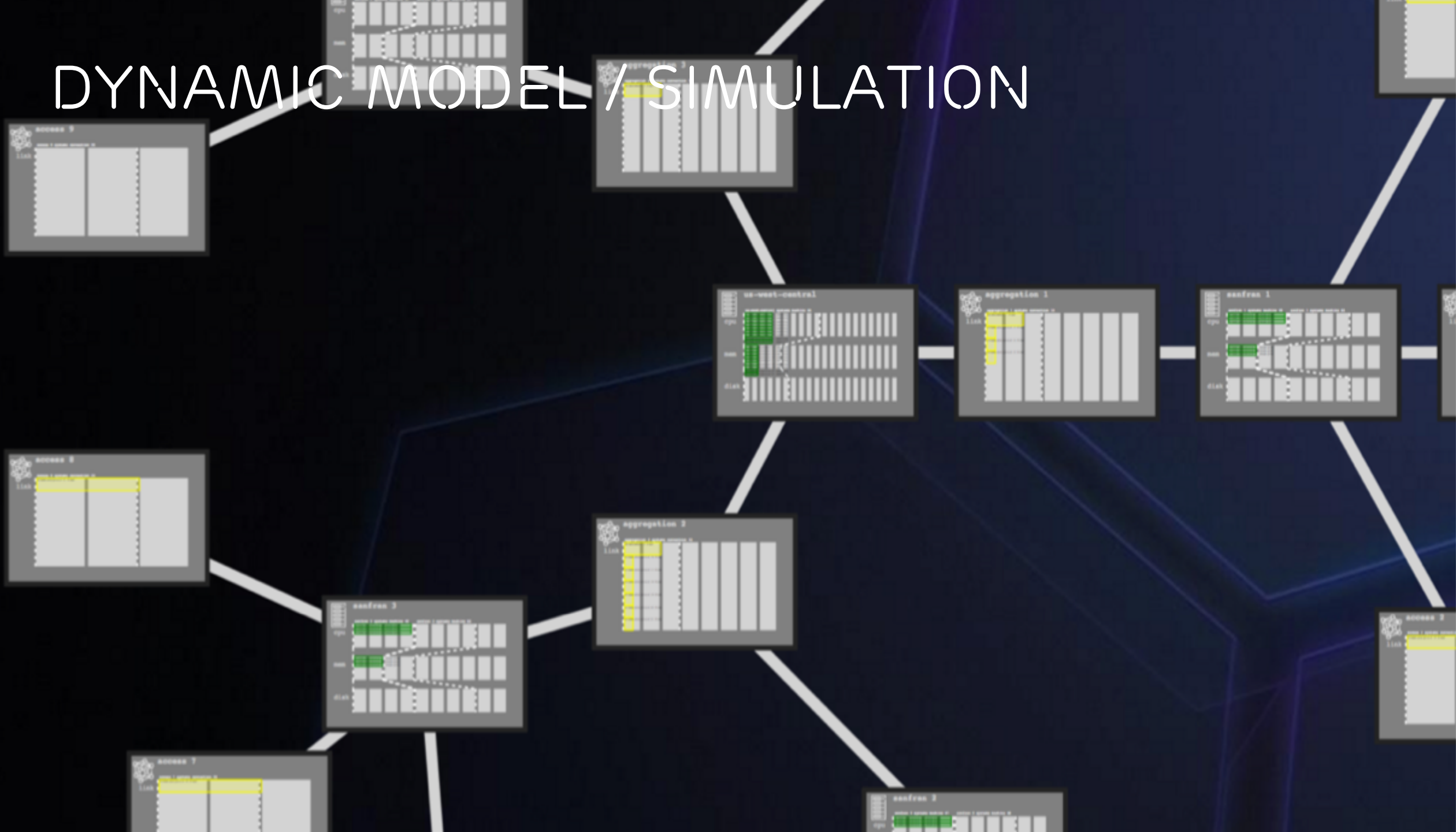
# APPLICATION EXAMPLES



# APPLICATION REQUIREMENTS

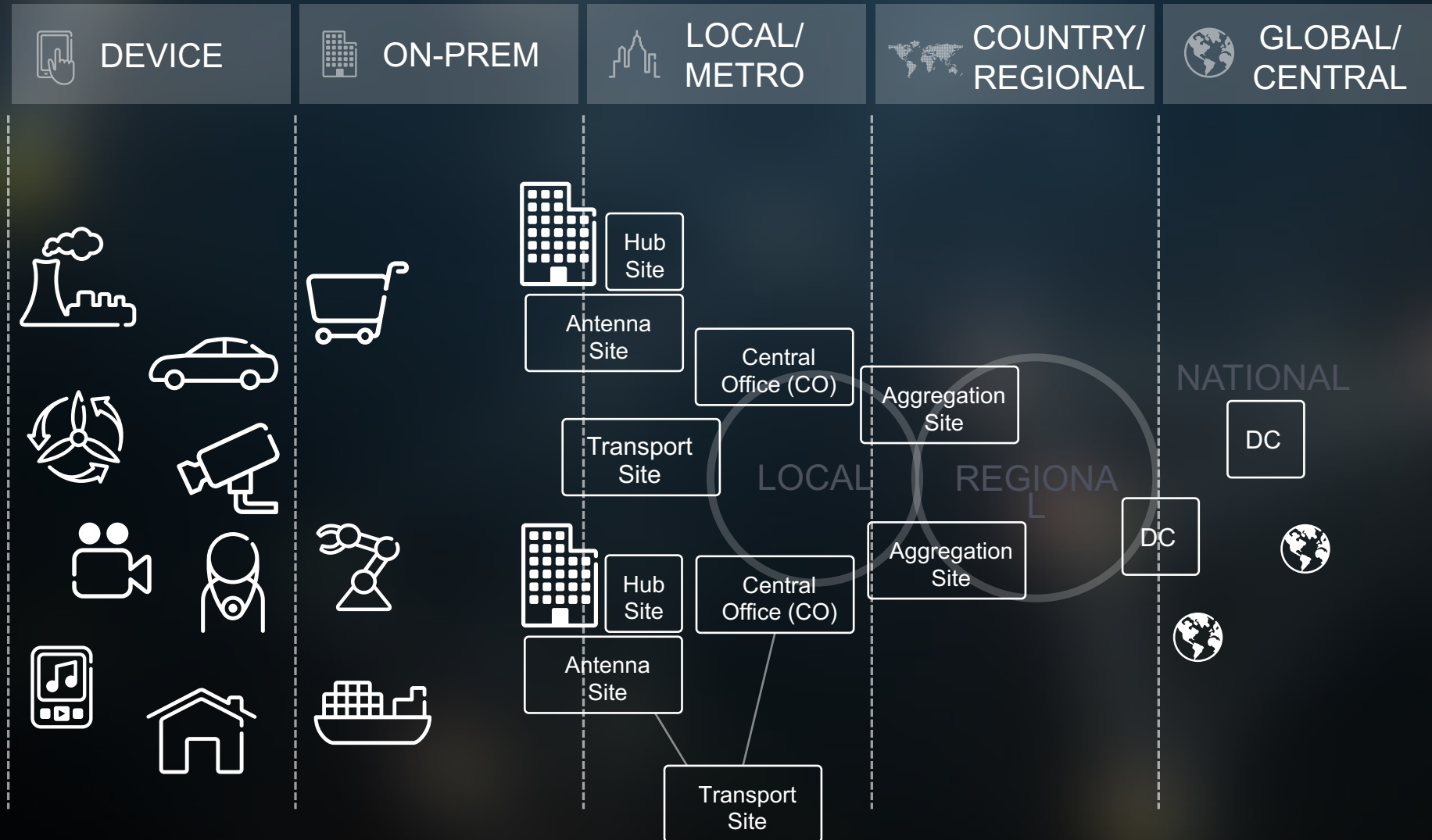


# DYNAMIC MODEL / SIMULATION

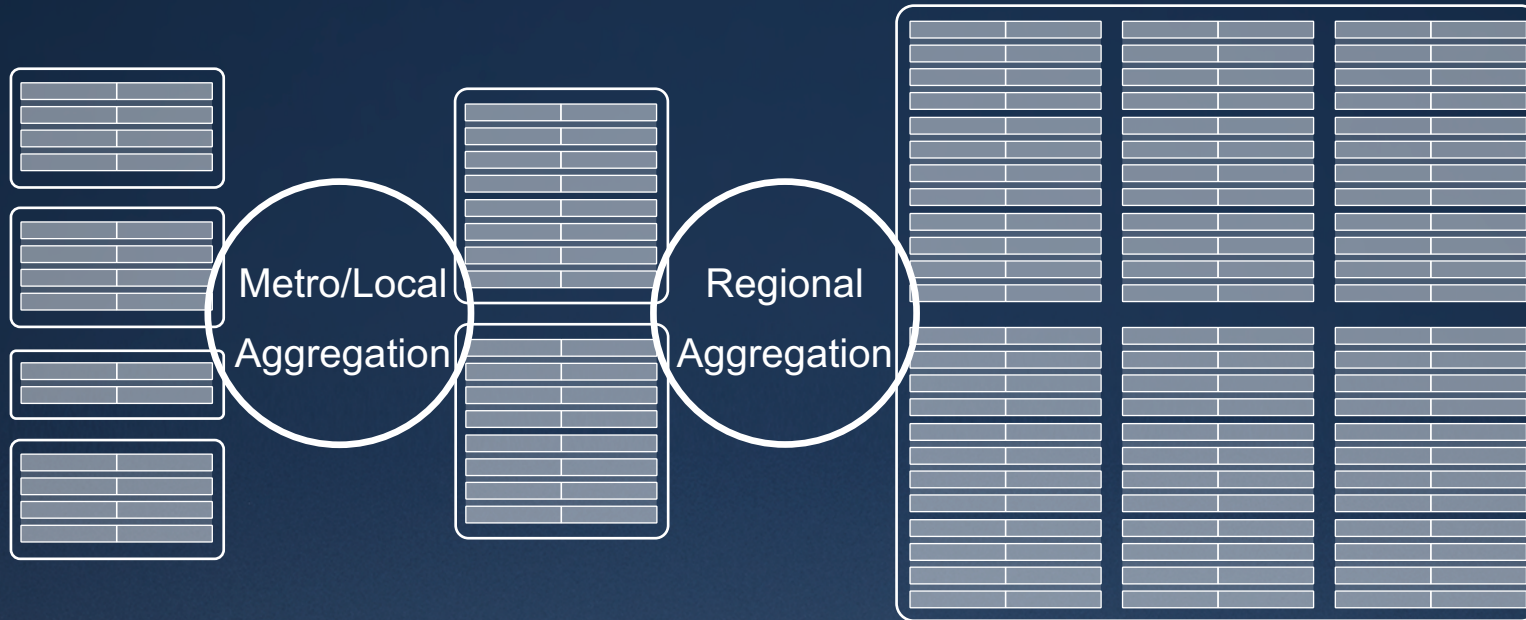




# OPERATOR NETWORK TOPOLOGY



# SITE TYPES, HARDWARE PROFILES



Software Defined Infrastructure (SDI)

Small Site  
Edge Optimized  
High Density

Medium Datacenter  
Hardware Pool  
NEBS/Small Footprint/High  
Capacity

Large Datacenter  
Hardware Pool  
RDS/Disaggregation/Accelerator  
s

Optical Interconnect

# OPEN SOURCING SDI CLIENT

Ericsson / ericsson-hds-agent Watch 10 Star 10 Fork 3

Code Issues 0 Pull requests 0 Projects 0 Pulse Graphs

Open Source HDS Agent

ocp ocp-platform data-center ericsson server-management

4 commits 1 branch 0 releases 1 contributor Apache-2.0

Branch: master New pull request Find file Clone or download

ironfugu committed on GitHub Merge pull request #2 from NodePrime/fixup\_readme Latest commit 2b44270 5 days ago

agent	Initial commit	10 days ago
docs	Merge pull request #2 from NodePrime/fixup_readme	5 days ago
examples	Initial commit	10 days ago
release	Initial commit	10 days ago
user-scripts	Initial commit	10 days ago
LICENSE	Initial commit	10 days ago
README.md	update README	5 days ago

README.md

## Ericsson HDS Agent

### What is Ericsson HDS Agent?

Ericsson HDS (Hyperscale Datacenter Systems) Agent is a Linux based program designed to run on any Linux System. It collects an inventory of the host machine's hardware inventory and runtime system metrics. It is composed of many built-in collectors, formatters and a forwarder.

```
graph LR; subgraph Collectors; S[SENSORS]; SR[SERVERS]; ST[STORAGE]; N[NETWORK]; I[IOT]; end; subgraph Forwarder; D((datahub)); end; subgraph External; SE[SEARCH]; EA[ANALYZE]; EM[MONITOR]; AC[ACTION]; ED[EXTERNAL DATABASE]; end; S -- Inventory --> D; SR -- Metrics --> D; ST -- Logs --> D; N -- Big Data --> D; D --> ED;
```

The diagram illustrates the data flow of the Ericsson HDS Agent. On the left, a dashed box contains five categories of data sources: SENSORS, SERVERS, STORAGE, NETWORK, and IOT. Arrows labeled 'Inventory', 'Metrics', 'Logs', and 'Big Data' point from these sources to a central 'datahub' icon. From the 'datahub', an arrow points to a right-side dashed box containing a vertical stack of processing and storage components: SEARCH, ANALYZE, MONITOR, ACTION, and EXTERNAL DATABASE.

# HIERARCHICAL SYSTEM STRUCTURE



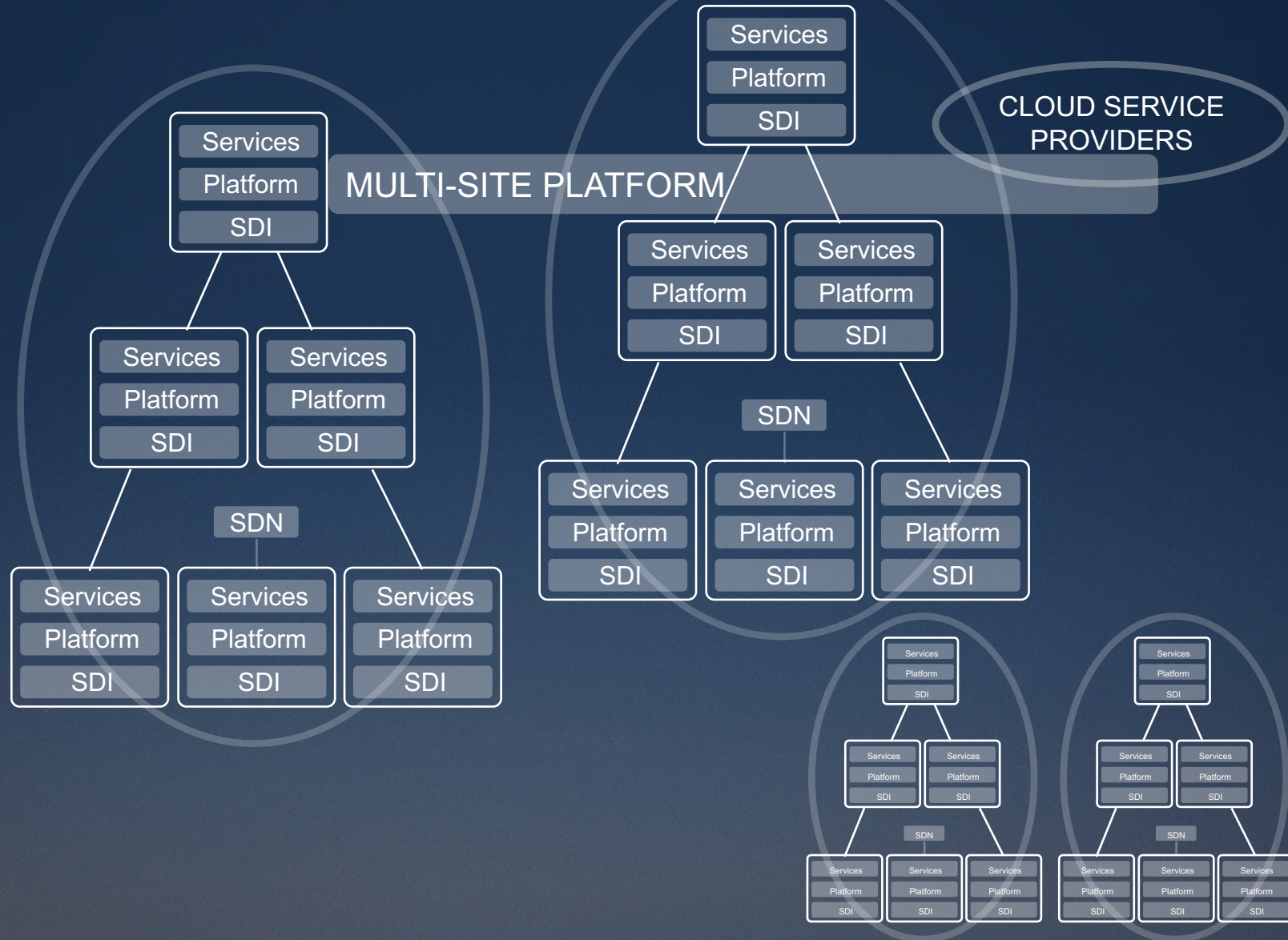
 GLOBAL/  
CENTRAL

 COUNTRY/  
REGIONAL

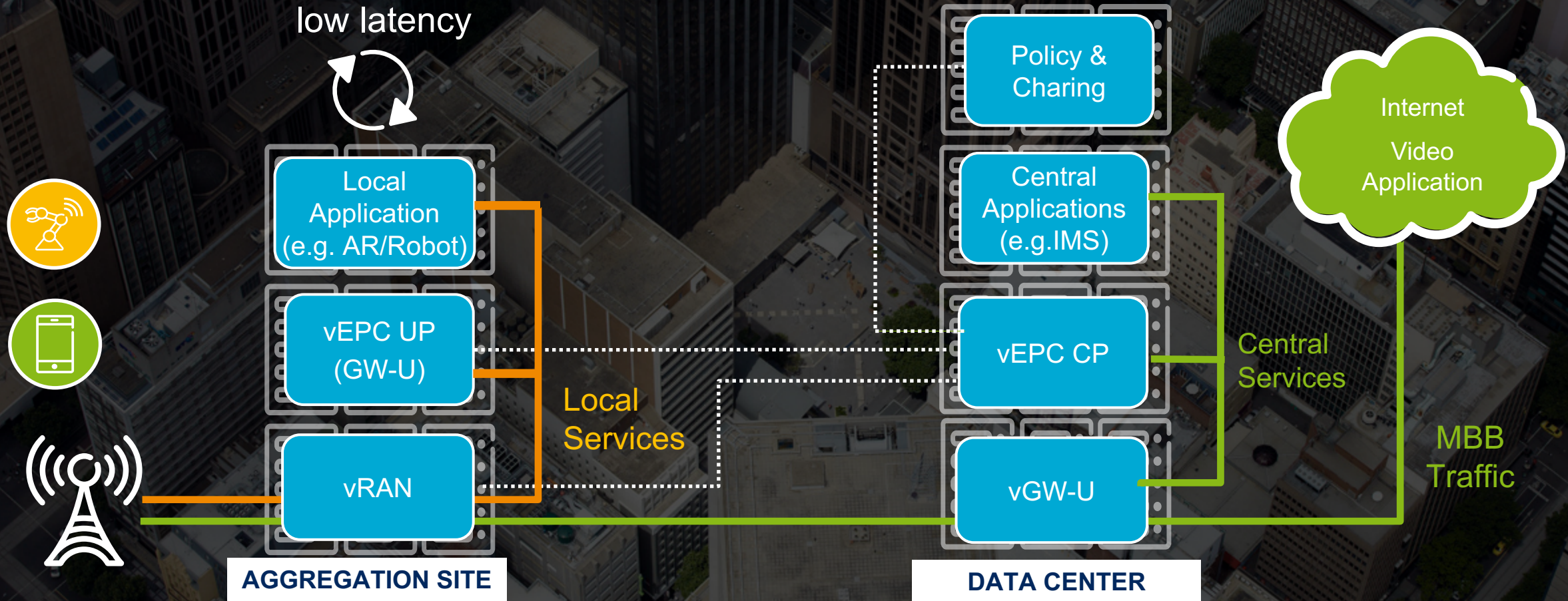
 EDGE/  
METRO

 ON-PREM

 DEVICE



# DEPLOYMENT EXAMPLE



# 5G READY ARCHITECTURE

# 5G

BSS/OSS (Control Mgmt, Orchestration, Analytics, Exposure, Monetization)

Virtualization

VNF

VNF

Software Defined Networking (SDN)

Distributed Cloud

Network Slicing





**ERICSSON**

