

# IEC Type 4 Blueprint: AR/VR at Edge

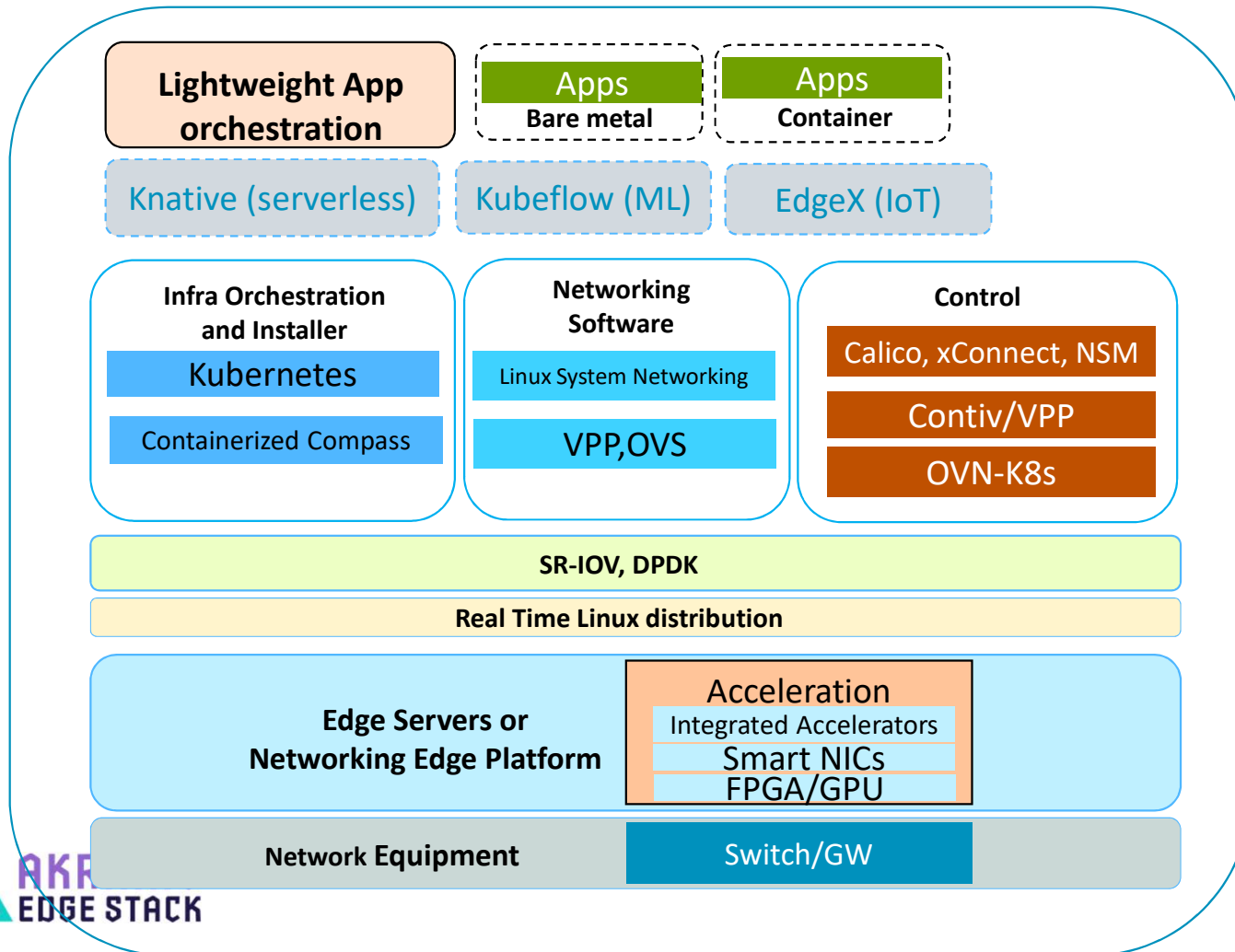
ARM, HTC, IBM, MobileEdgeX, Visby, Orange, PSU

Wenping Ying, TPL

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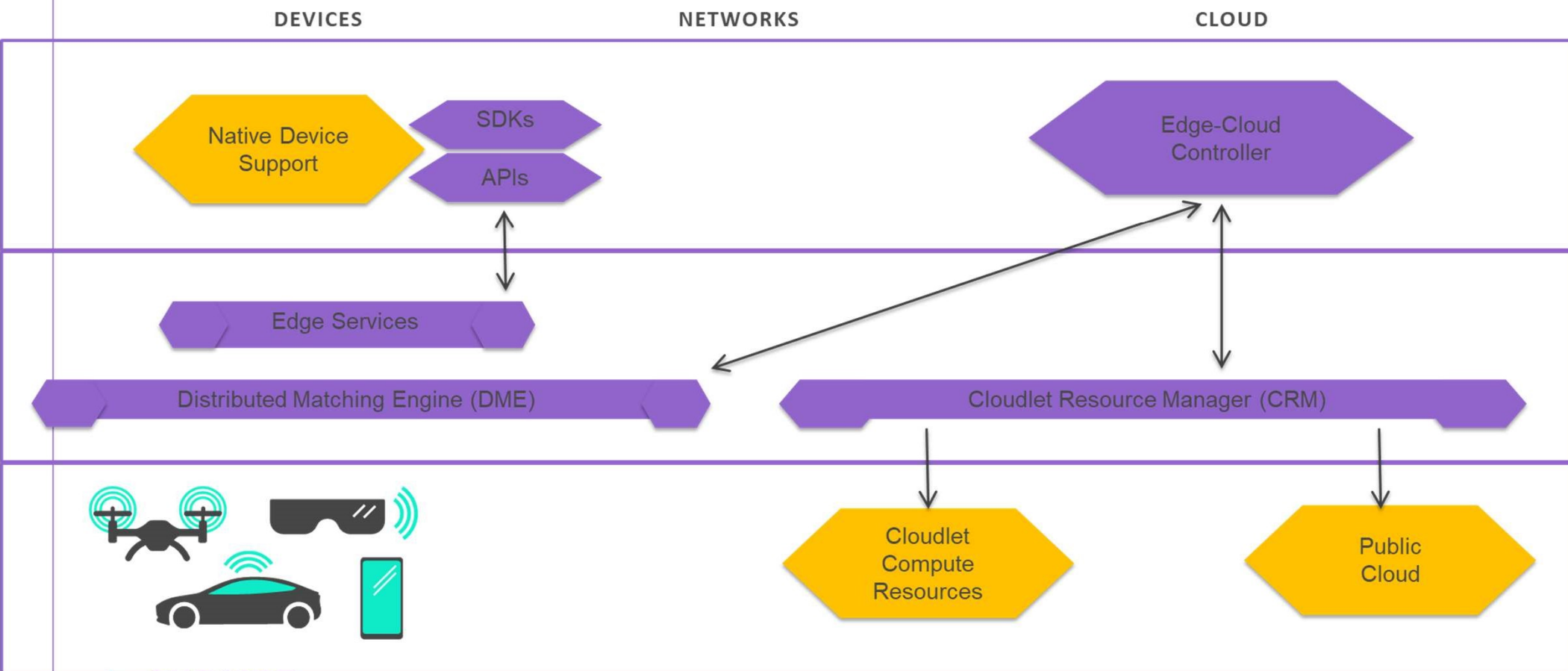
 **LF** EDGE

# Integrated Edge Cloud Reference Stack

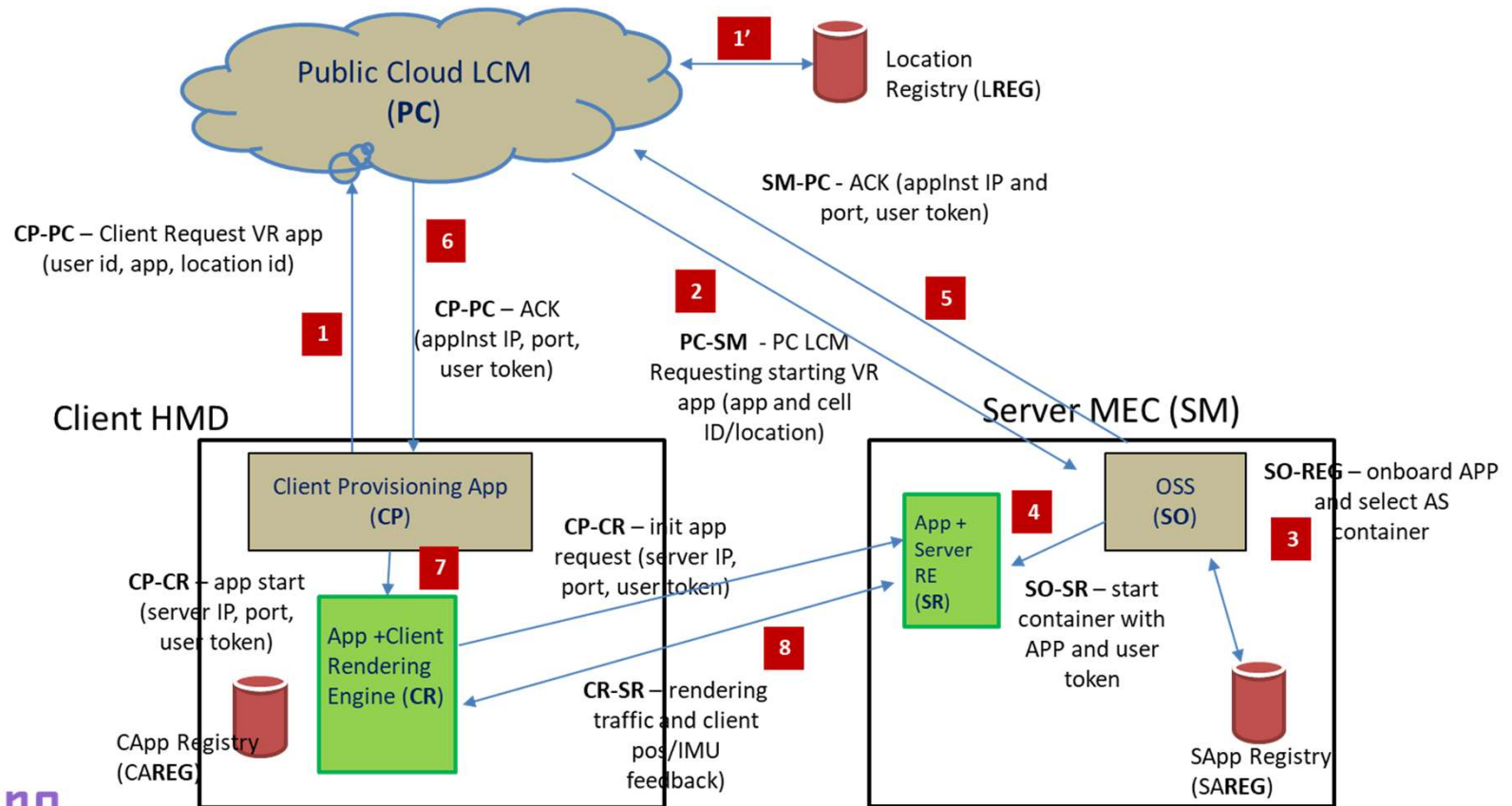


- Heterogeneous Architecture
  - VM, container, bare metal
  - Servers and customized Edge platforms
  - Virtualized NFs and Physical NFs
  - Accelerator interface
- Resource constraints
  - Kubernetes
  - SDN Controller for K8s
- HW Accelerations
  - Integrated accelerators
  - PCIe/CCIX attached accelerator (Smart NICs...)

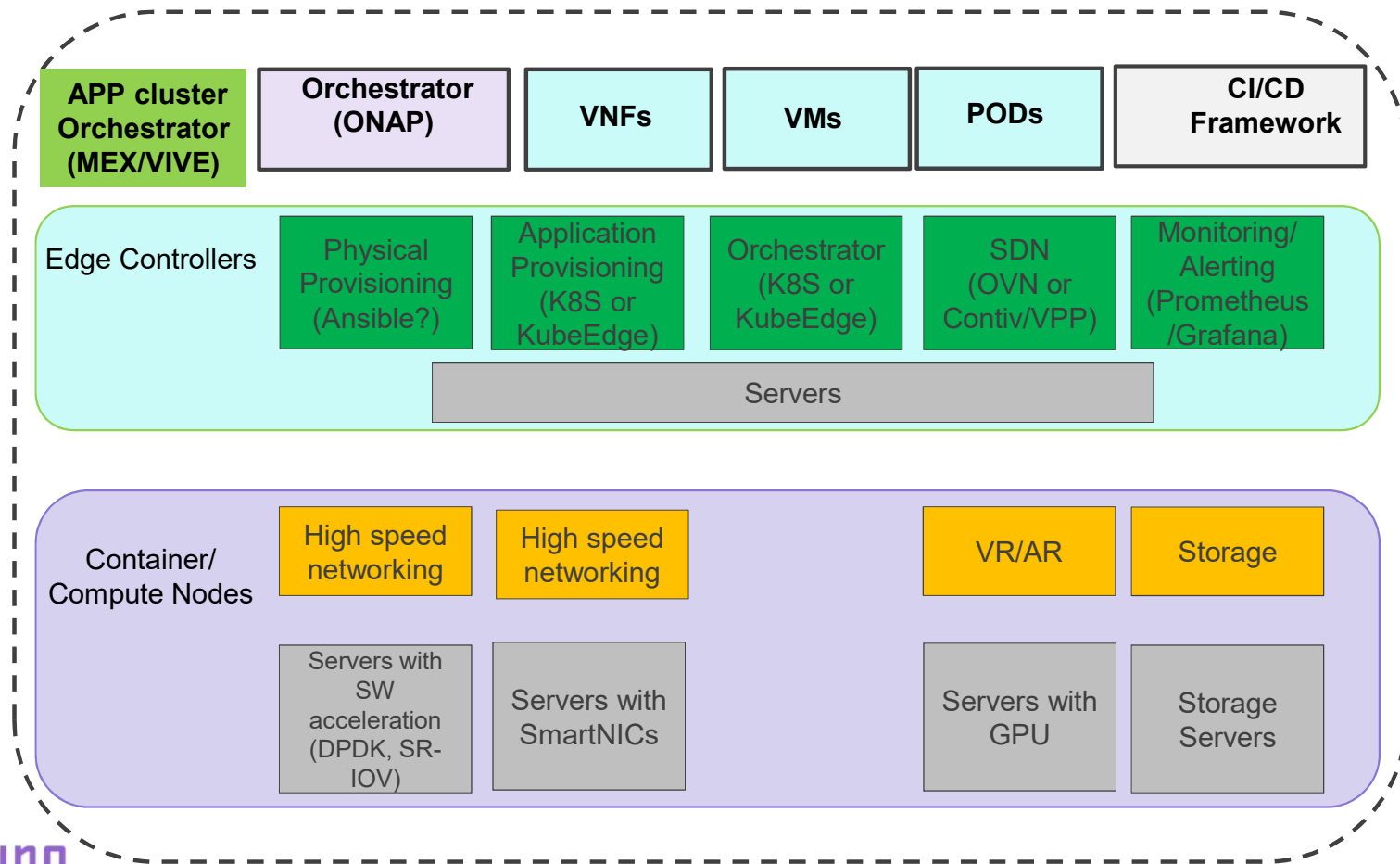
# Distributed Application Mobility Architecture (MEX)



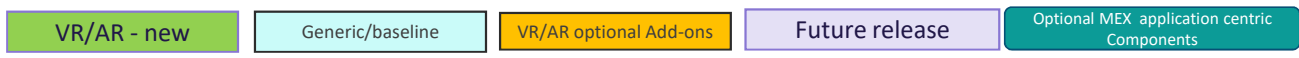
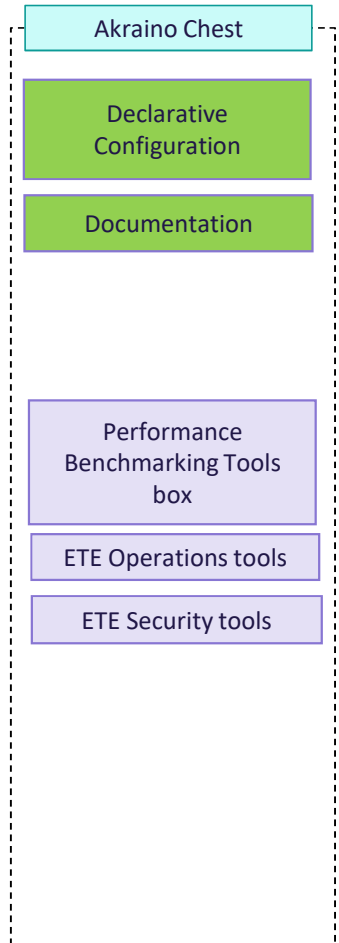
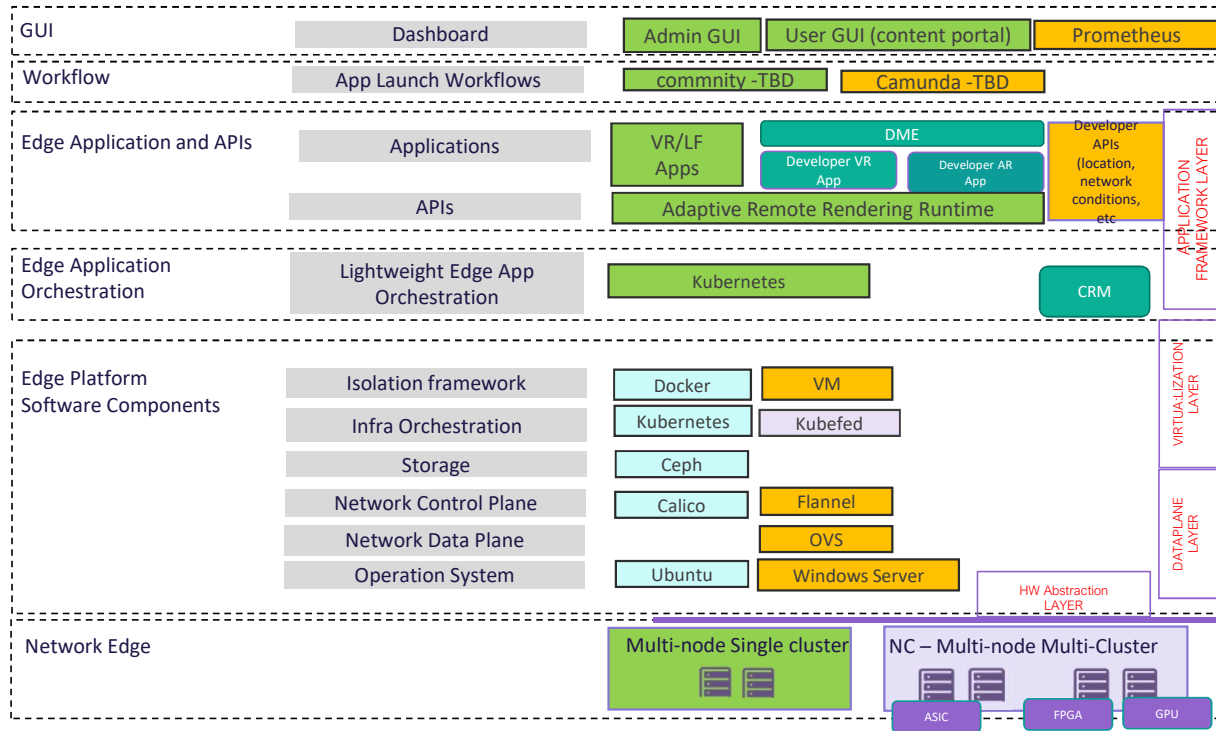
# Cloud VR Vertical Deployment Architecture (VIVE)



# Scope of Type 4 AR/VR Edge Cloud



# Proposed Generic/Baseline AR/VR Blueprint



# Cloud VR/AR Blueprint Spec

Case Attributes	Description	Informational
Type	New Blueprint for VR/AR on the Network Edge	
Blueprint Family - Proposed Name	Integrated Edge Cloud (IEC) Type 4	
Use Case	Deployment of generic edge end and cloud environment for VR/AR cloud streaming	ref to use case supplementary material
Blueprint proposed Name	IEC Type 4: Generic AR/VR oriented Edge Stack for Integrated Edge Cloud (IEC) Blueprint Family	
Initial POD Cost (capex)	Leverage IEC Type 1 Blueprint - less than \$120k (3 nodes)	
Scale & Type	Generic blueprint PoC: <ul style="list-style-type: none"> <li>- One master node and up to 5 worker nodes with mixed Linux and optional Windows OS</li> <li>- Each server, x86/ARM server with nVidia RTX GPUs (Titan or GeForce TBD)</li> </ul> Large scale deployment: <ul style="list-style-type: none"> <li>- Number of servers, x86/ARM server or deep edge class, is site dependent (footprint)</li> <li>- vGPU and federation supported class, e.g. NVIDIA Tesla K80 GPUs;</li> <li>- Chelsio T580-CR NIC</li> </ul>	
Applications	Generic blueprint PoC: Small scale cloud AR/VR rendering farm with generic SO 1. High performance premium gaming, 3D/Light-field video for movies, live concerts, events, LBE, etc. 2. Enterprise applications, including training/education, product design collaboration, manufacturing, maintenance, data analytical etc,	
Power Restrictions	N/A	
Infrastructure orchestration	Docker 18.09.4 or above (19.03 may be needed to run optional windows container with nVidia GPU support) and K8s 1.14.1 or above- Container Orchestration, VMWare VM OS - Ubuntu 18.04.2, windows server 2019	
SDN	Calico and K8s, or or SR-IOV, OVS-DPDK	
Workload Type	VR and AR applications with adaptive remote/split rendering runtime running inside Containers or VM	
Additional Details	The test configuration consists of 3 machines connected using ethernet switch: a master and 2 worker nodes, each with TBD processor clocked at TBD GHz, with TBD GB of RAM and Ubuntu operating system for master, windows server 2019 or later for worker. MTU of 1450B is configured (to compensate for GTP tunnel header). Each windows server preconfigures with 2-3 VMs with fixed GPU allocation per VM.	



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