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Converged Networks and Mobility

Edge Computing Architecture

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2021 Fall Technical Forum
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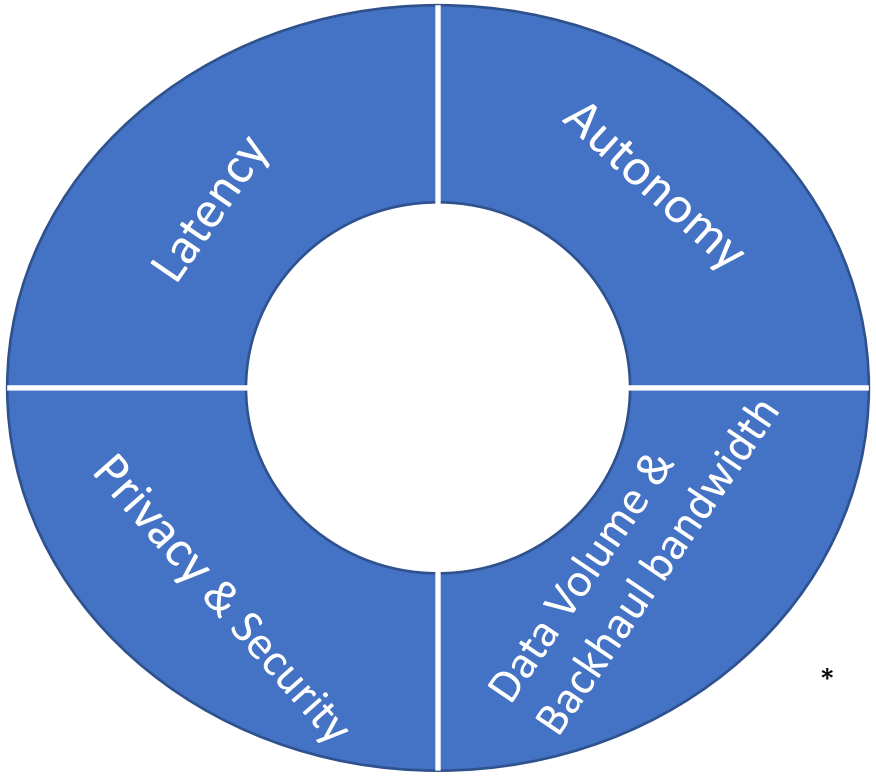
MOTIVATION FOR EDGE COMPUTING

- Mission critical applications from many verticals need ultra low latency
- Much of data needs local processing to address
  - context awareness
  - autonomy in decision making
  - meet the latency demands
- Enable administrative domain generating data to enforce policy
- By the year 2025, 150 zettabytes of data need to be processed and over half of it comes form edge device. Minimize transport overhead



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* Adapted from Gartner, 2021 Strategic Roadmap for Edge Computing

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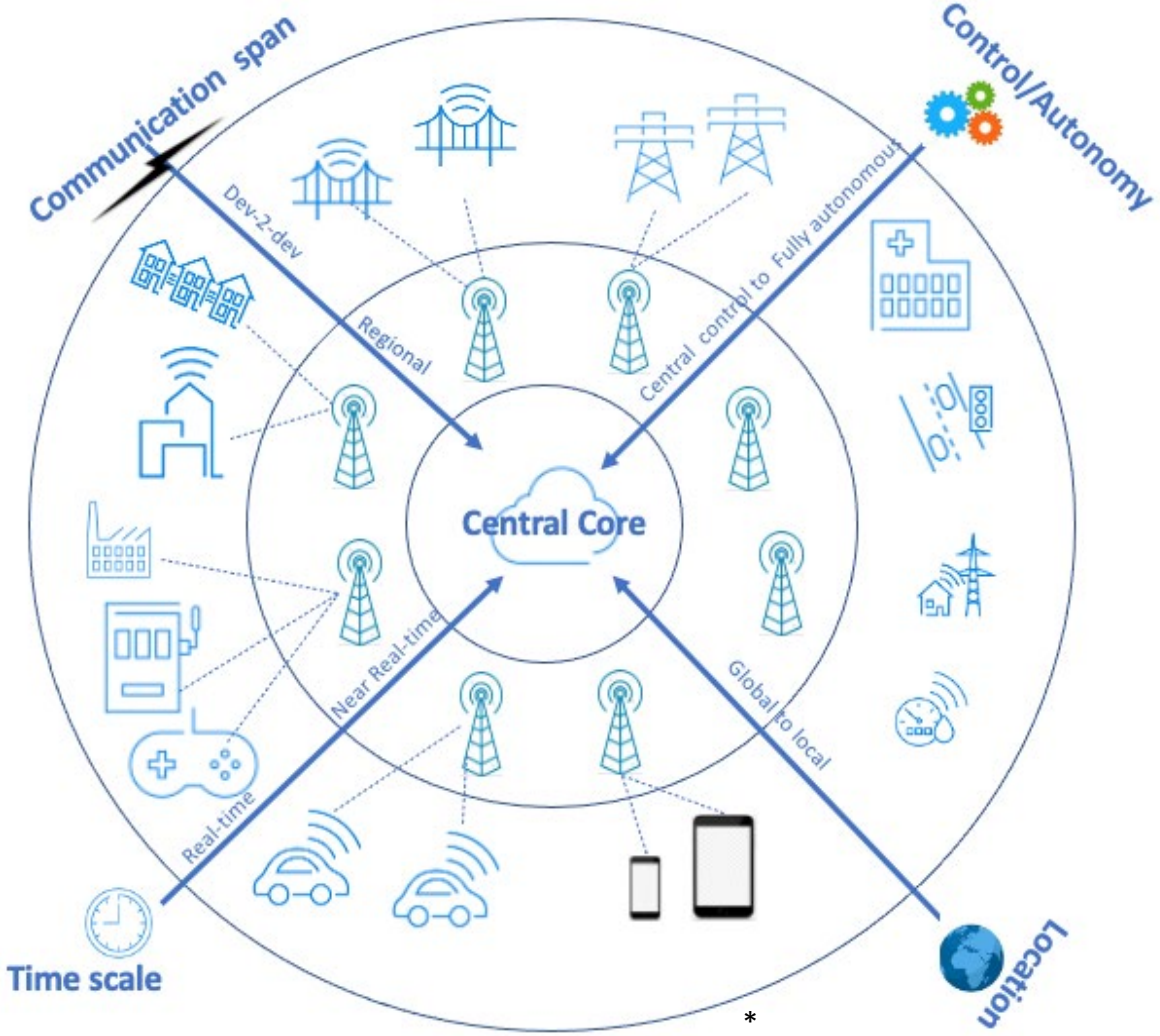
DIMENSIONS OF EDGE COMPUTING

- Time
  - Real time, near-real-time, non-real-time
- Location
  - Location awareness/accuracy needed
- Control/Autonomy
  - Local vs. Central
- Communication span
  - Device to device (D2D), regional, global
- Many use cases across different verticals benefit from this
  - Smart cities
  - Industry 4.0
  - AR/VR



* Adapted from : Fog Computing: Principles, Architectures, and Applications, Amir Vahid Dastjerdi, Harshit Gupta, Rodrigo N. Calheiros, Soumya K. Ghosh, and Rajkumar Buyya

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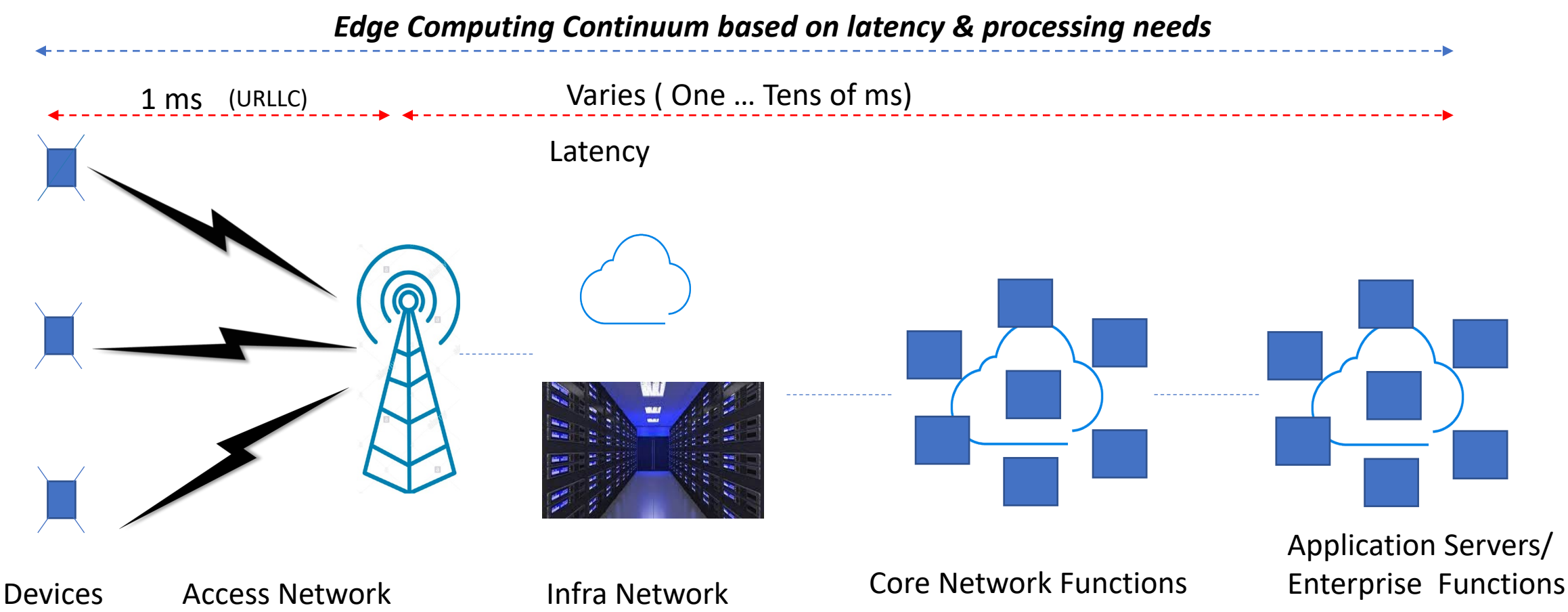
EDGE COMPUTING CONTINUUM (1 of 2)



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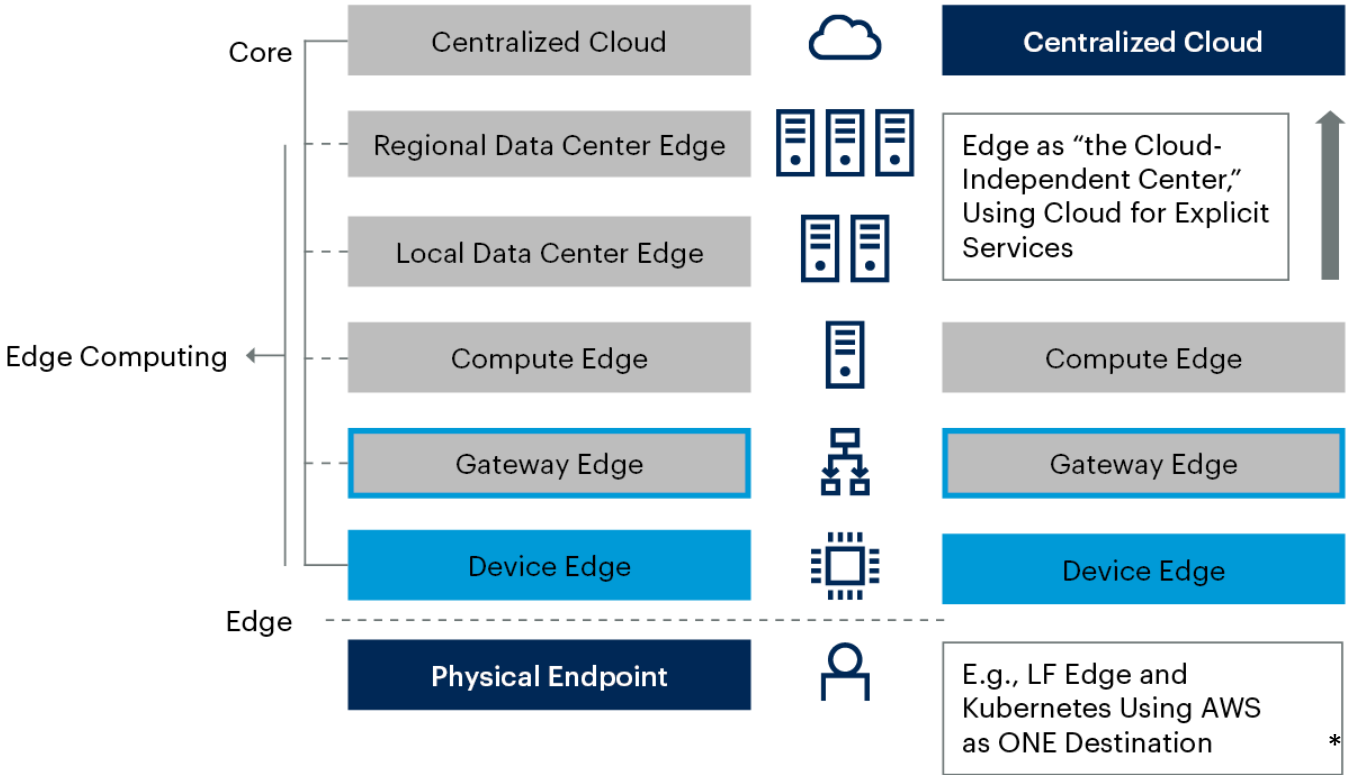
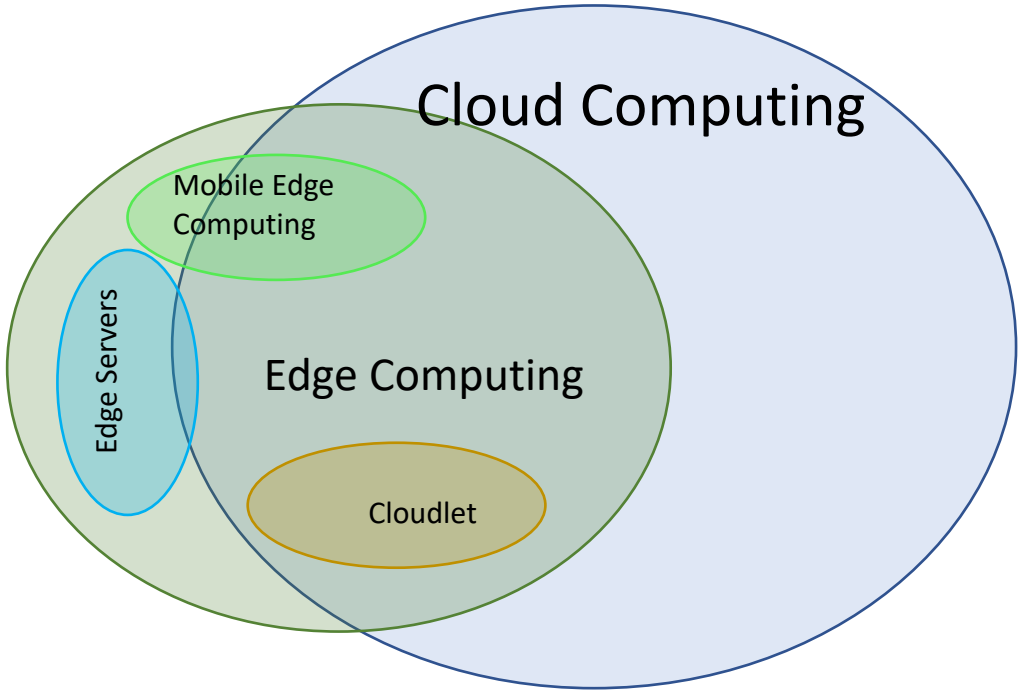
EDGE COMPUTING CONTINUUM (2 of 2)





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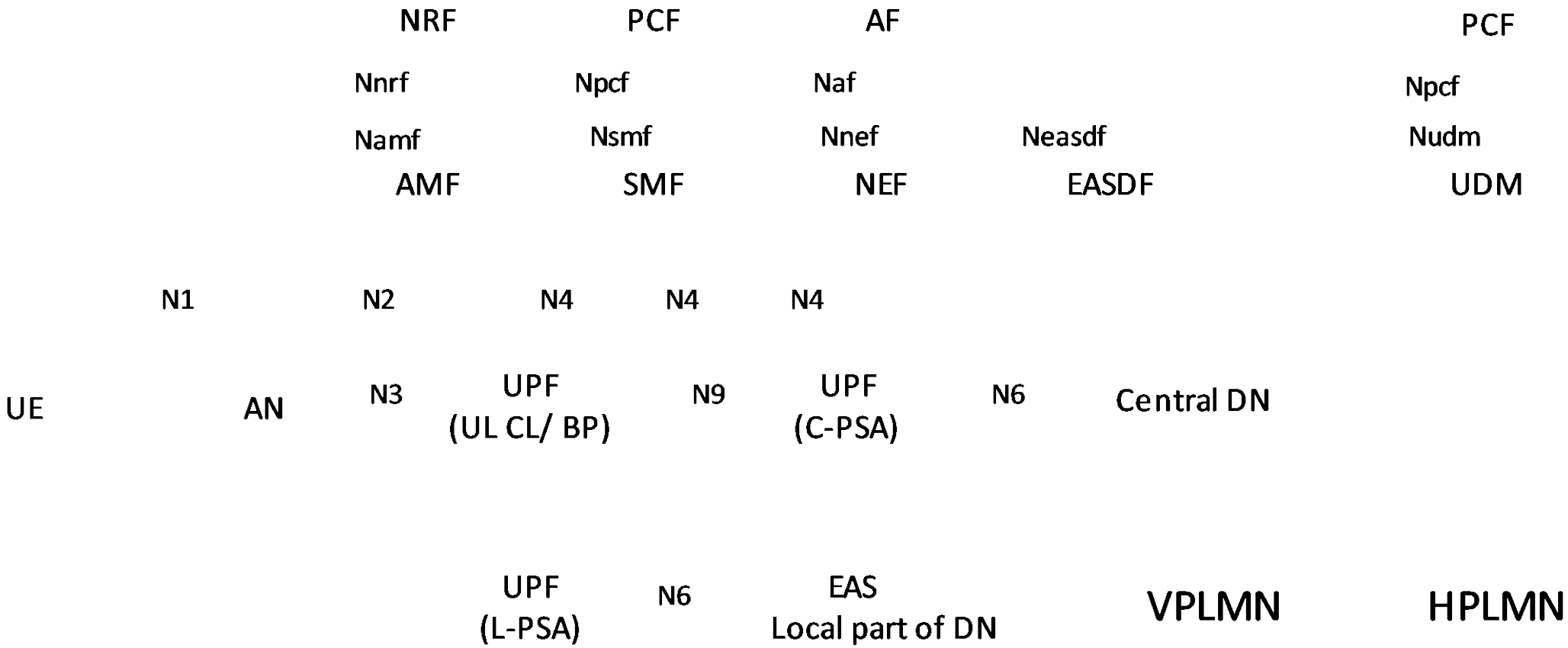
3GPP EDGE COMPUTING ARCHITECTURE



Ref: 3GPP Technical Spec TS 23.548

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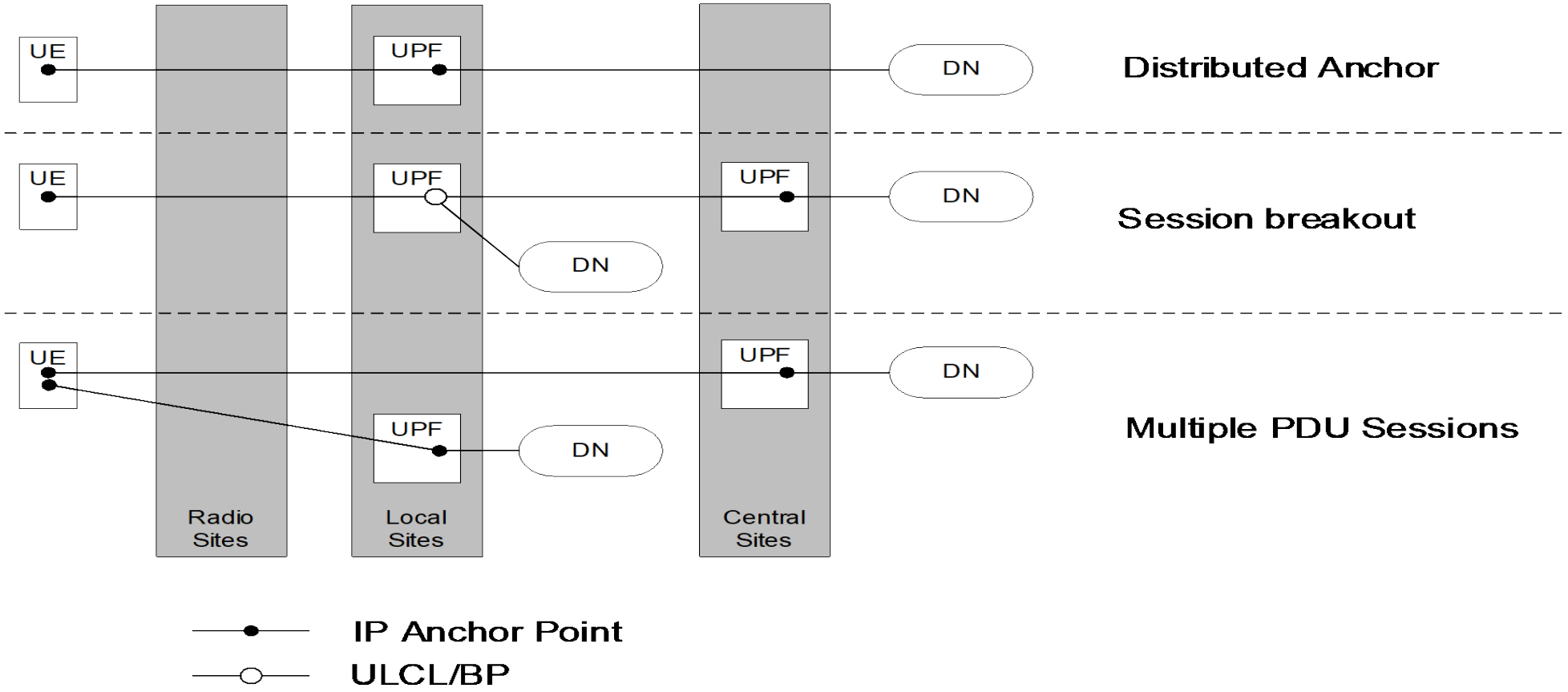
3GPP EDGE COMPUTING CONNECTIVITY MODELS



Ref: 3GPP Technical Spec TS 23.548

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3GPP FEATURES SUPPORTING EDGE COMPUTING

- Salient features in 3GPP 5GS supporting Edge Computing
  - Flexible placement of UPFs
  - Simultaneous connections to multiple data networks
  - Support for Multi-homed PDU Sessions
  - Enhanced Session and Service Continuity (SSC)
  - The Application Function (AF) can influence traffic routing for a given UE

- On going standardization effort in 3GPP for EC in Rel.17 specifications
  - Edge Application Server (re)discovery
  - Edge Relocation
  - Network Exposure to Edge Application Server
  - Enhanced support for Edge Computing in 3GPP architecture

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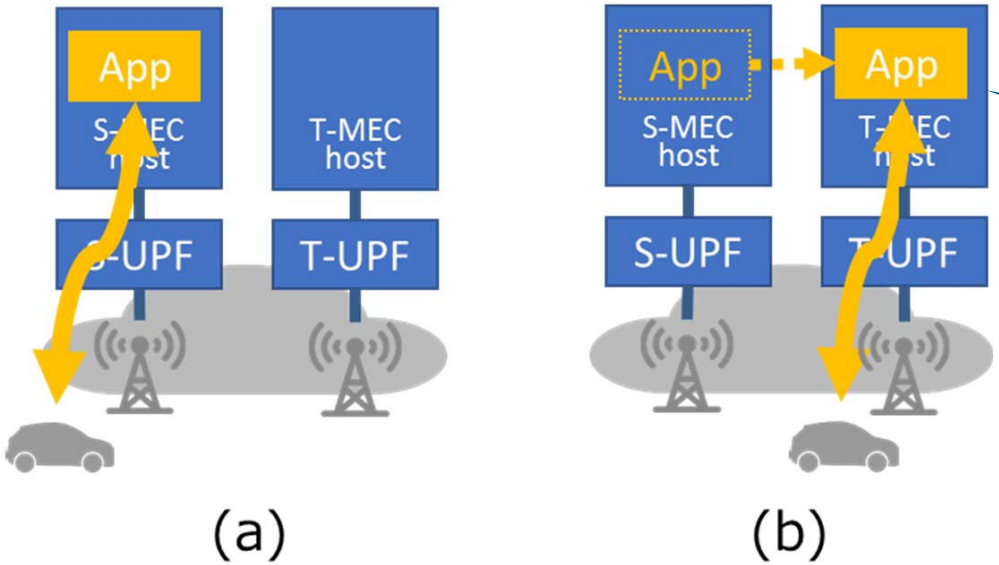
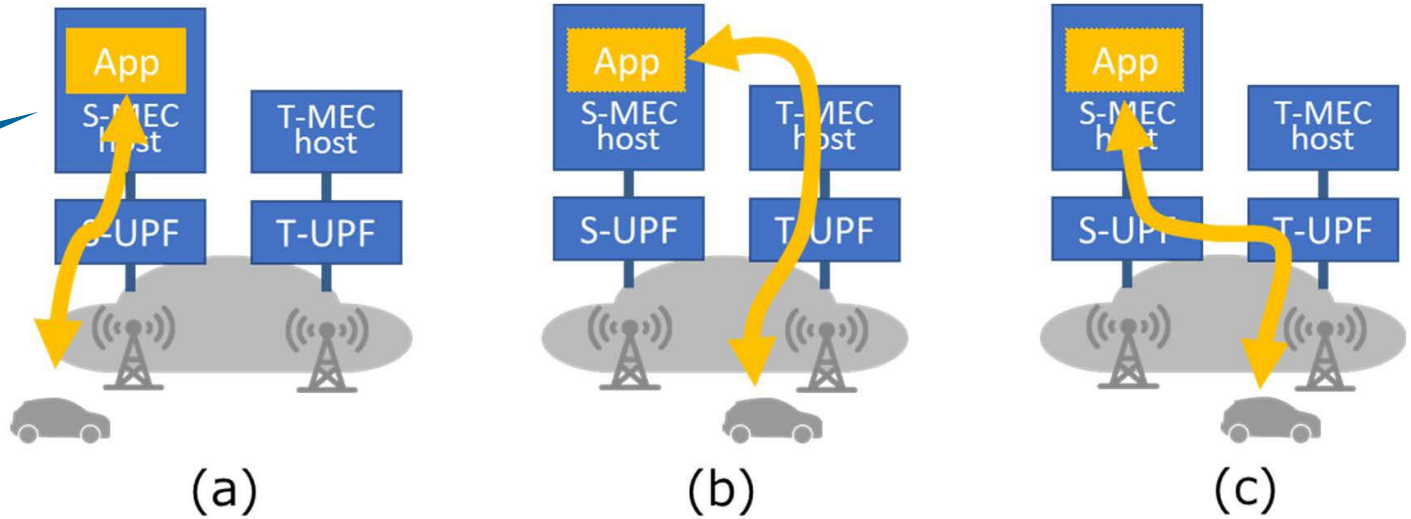
ETSI MEC DEPLOYMENT MODELS



(a) (b)

Mobility Support with Target host supporting MEC applications

Mobility Support with Target host *not* supporting MEC applications



(a) (b) (c)

Ref: ETSI: Multi Access Edge Computing (MEC): MEC 5G Integration, ETSI GR MEC 031 V2.1.1

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- Edge computing is delivering on its promise by significantly optimizing
  - Time-to-insight
  - Time-to-action
  - Cost-of-insight
- Enabling timely and effective decision making and opening new avenues of opportunities
- Standardization efforts in 3GPP, ETSI, IETF etc. facilitating further smoother integration
- To harmonize and accelerate progress of EC, all stakeholders should contribute to standards bodies and industry alliances

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Thank You!

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