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# **Mobile Edge Compute** *in Brief*

February 2014

# Mobile Edge Computing (MEC)

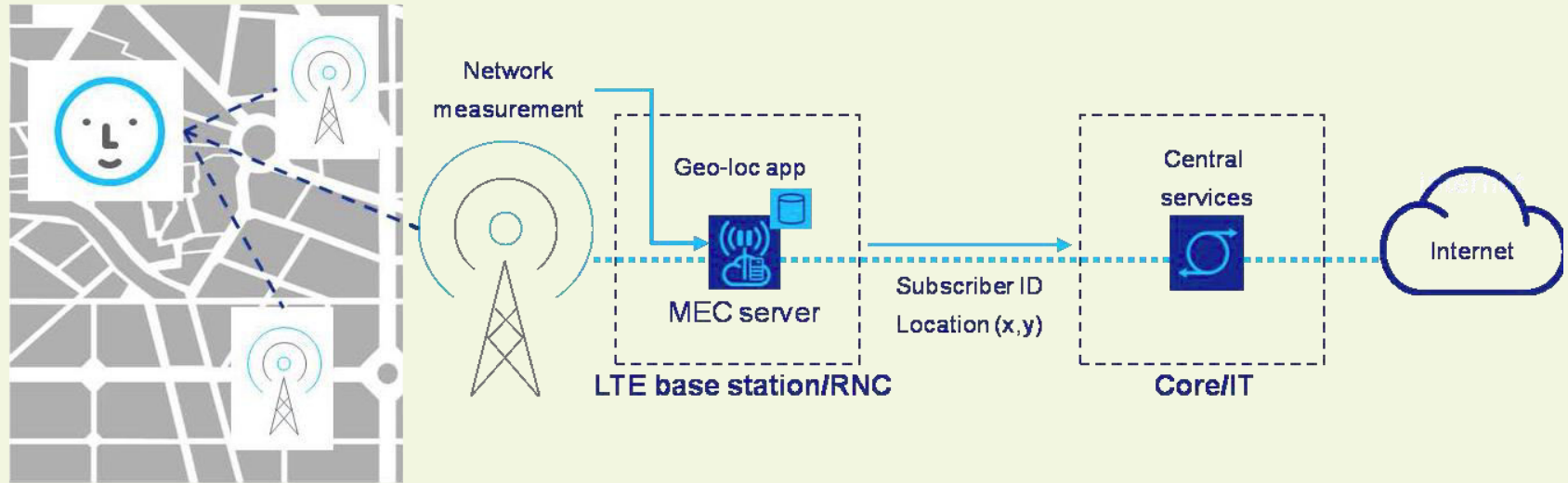
- › MEC can be seen as a cloud server running at the edge of a mobile network and performing specific tasks that could not be achieved with traditional network infrastructure (e.g. Machine-to-Machine gateway)
- › MEC allows content, services and applications to be accelerated, increasing responsiveness from the edge
- › The mobile subscriber's experience can be enriched through efficient network and service operations, based on insight into the radio and network conditions
- › Operators can open the radio network edge to 3<sup>rd</sup> party partners, allowing them to rapidly deploy innovative applications and services towards mobile subscribers, enterprises and other vertical segments

**Translate proximity, context, agility and speed into valuable opportunities for mobile operators, service and content providers, OTT players and ISVs by allowing them to monetize the mobile broadband experience**

# MEC for Indoor Applications

- › Machine-to-machine / IoT
  - Connecting to various sensors for monitoring activities
    - Air conditioning, elevators, temperature, humidity, access control, etc.
- › Retail solutions
  - Locate and communicate with mobile devices
  - Opportunity to deliver higher value to the consumers and the malls
    - E.g. delivering content based on location, implementing augmenting reality, improving the overall shopping experience, or dealing with secured online payment
- › Public venues: stadiums, airports, stations, theatres
  - Specific services to help manage crowded places, in particular to deal with safety, security, evacuation, or to provide new kinds of services to the public
    - E.g. stadiums could provide live content to the public, airports could guide passengers to their gate through an augmented reality service
- › Big data and Analytics
  - Information gathered can be leveraged as part of a bigger analytics initiative to serve customers better

# Mobile Edge Computing Use Cases: Active Device Location & Tracking

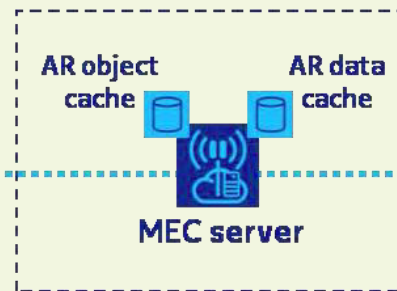


- › Enables real-time, network measurement based tracking of active (GPS independent and network determined) terminal equipment, using 'best-in-class' third-party geo-location algorithms within a geo-location application hosted on the MEC server
- › Enables location based services for enterprises and consumers (e.g. on opt-in basis), for example in venues, retail locations and traditional coverage areas where GPS coverage is not available

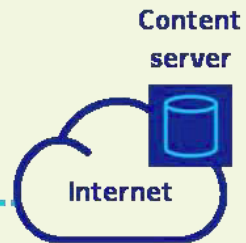
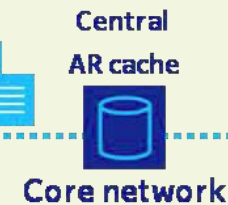
# Mobile Edge Computing Use Cases: Augmented Reality (AR) Content Delivery



High bandwidth low latency content delivery

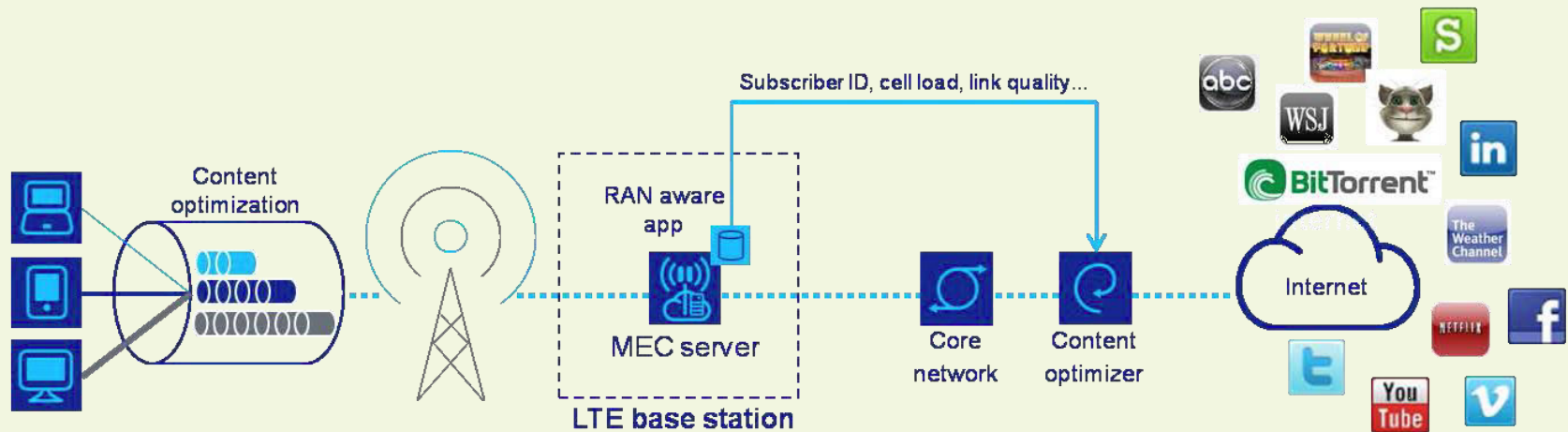


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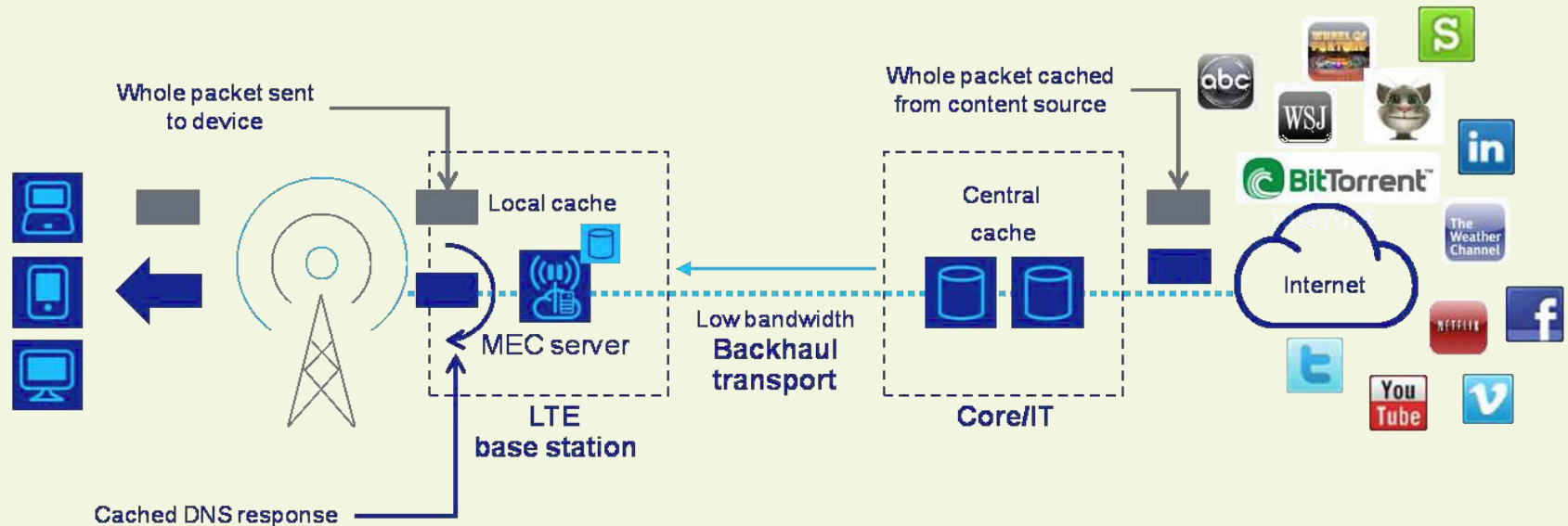
- › An AR application on a smart-phone or tablet overlays augmented reality content onto objects viewed on the device camera
- › Applications on the MEC server can provide local object tracking and local AR content caching

# Mobile Edge Computing Use Cases: RAN-aware Content Optimization



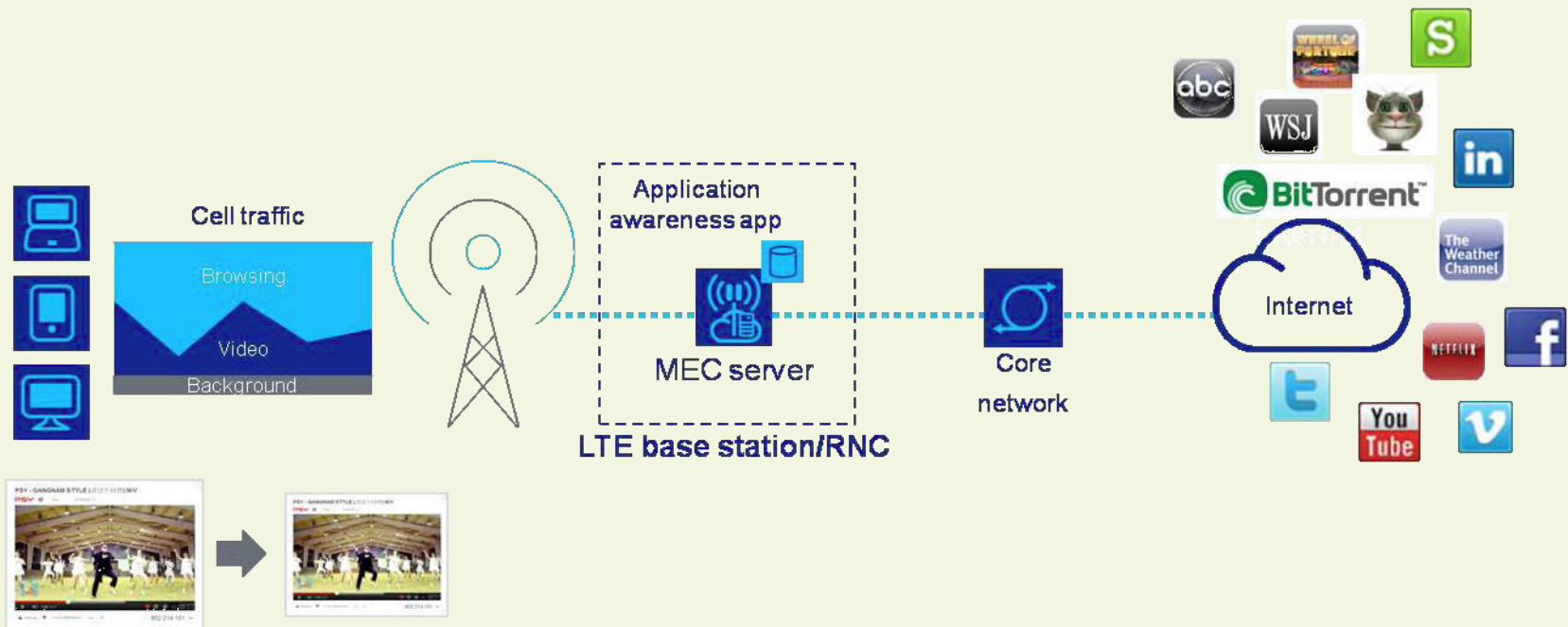
- › The application exposes accurate cell and subscriber radio interface information (cell load, link quality) to the content optimizer, enabling dynamic content optimization, improving QoE, network efficiency and enabling new service and revenue opportunities
- › Dynamic content optimization enhances video delivery through reduced stalling, reduced time-to-start and 'best' video quality

# Mobile Edge Computing Use Cases: Distributed Content and DNS Caching



- › A distributed caching technology can provide backhaul and transport savings and improved QoE
- › Potential to reduce backhaul capacity requirements by up to 35%. Local Domain Name System (DNS) caching can reduce web page download time by 20%

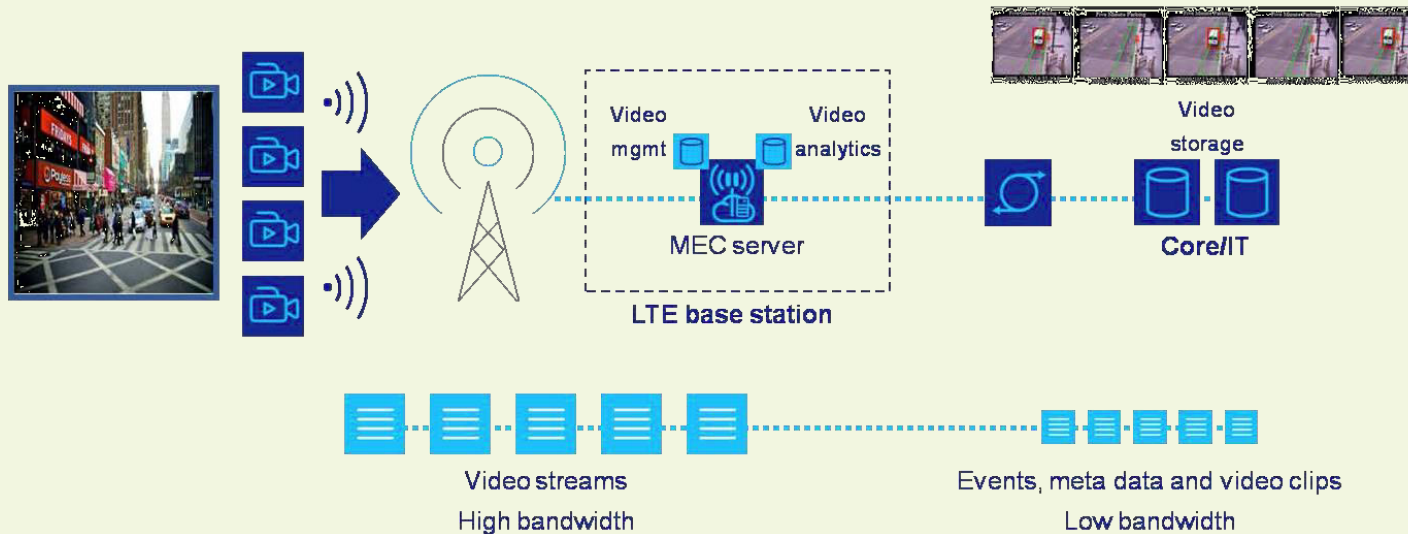
# Mobile Edge Computing Use Cases: Application-Aware Performance Optimization



- › Application-aware cell performance optimization for each device in real time can improve network efficiency and customer experience. It reduces video stalling and increase browsing throughput
- › The solution can also provide independent metrics on application performance

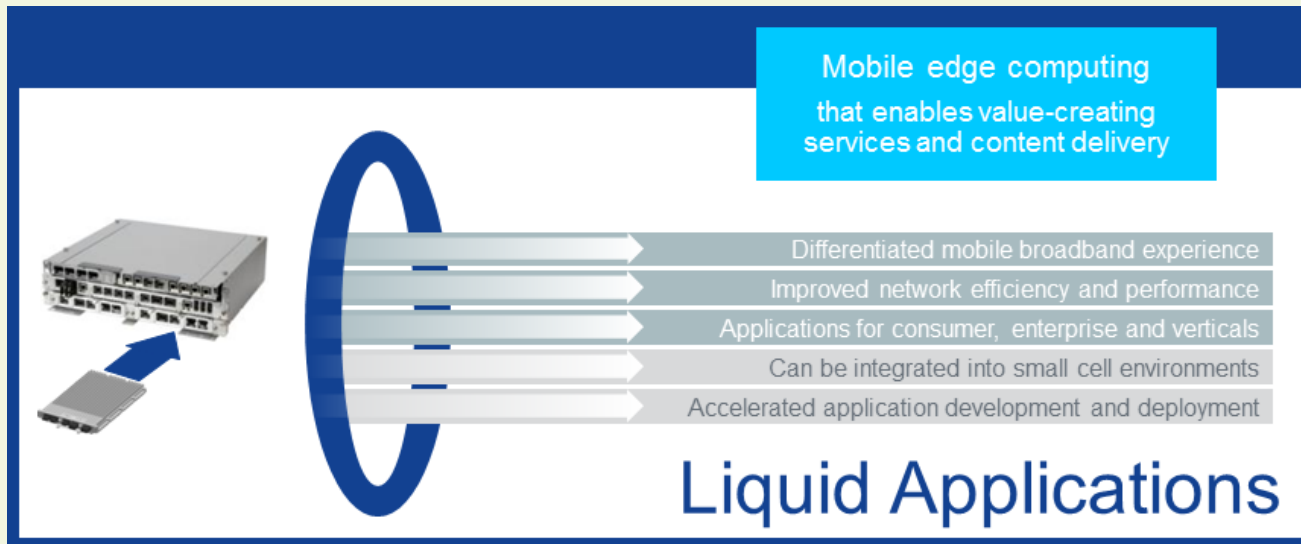


# Mobile Edge Computing Use Cases: Video Analytics



- › The video management application transcodes and stores captured video streams from cameras received on the LTE uplink
- › The video analytics application processes the video data to detect and notify specific configurable events e.g. object movement, lost child, abandoned luggage
- › The application sends low bandwidth video metadata to the central operations and management server for database searches
- › Applications may range from safety, public security to smart cities

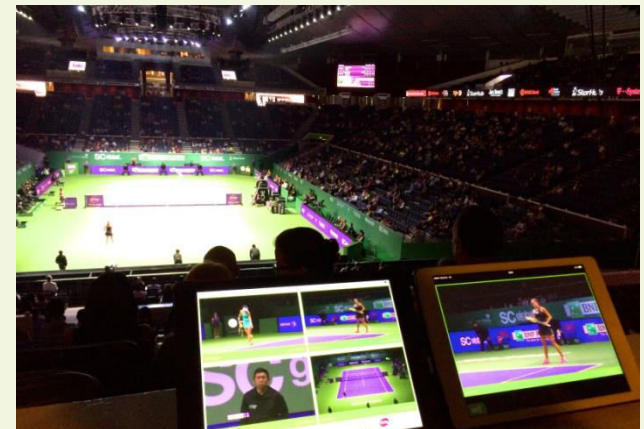
# Applications Market In The Industry - Example



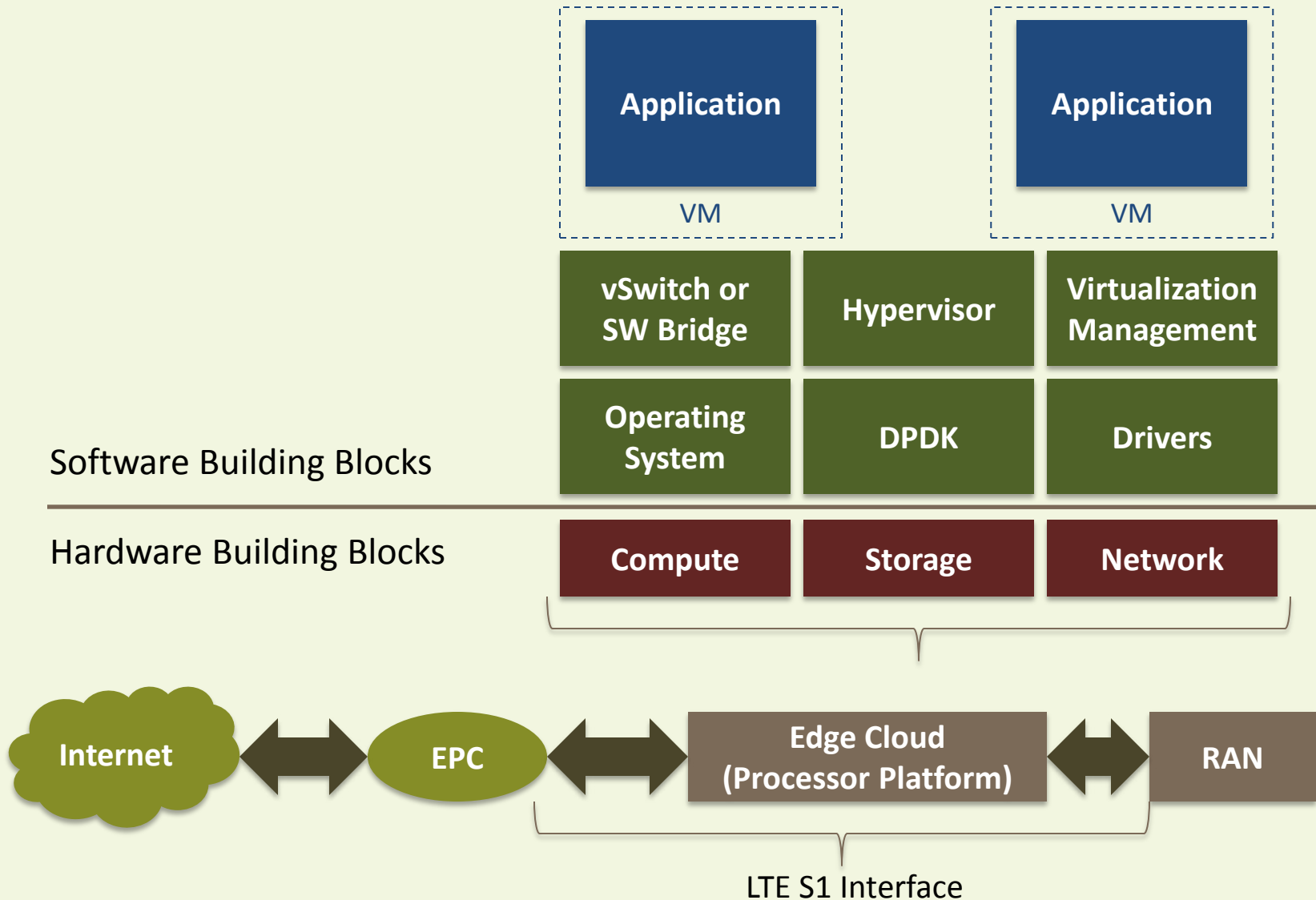
## Nokia Liquid Applications

Example: StarHub deployment at  
Singapore Sports Hub indoor  
stadium.

Deliver 4 live video feeds to subscribers



# Architecture



# About Xona Partners

**A Boutique Advisory Firm Specialized in Developing New Technology Ventures & Growth Strategies**

## Clients / Activities



### **Private Equity & Venture Funds**

- M&A due diligence; competitive analysis & positioning



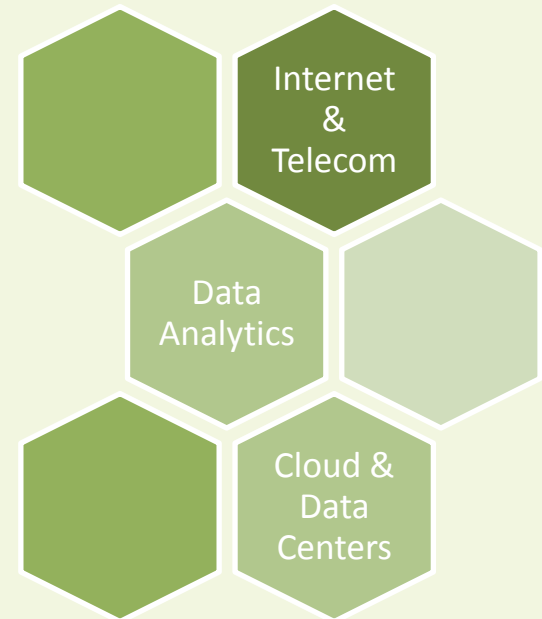
### **Technology Corporations**

- Develop new business ventures



### **Governments, Regulatory & Policy Makers**

- Market & technology assessment to form policy decisions



# XONA Partners

*Jointly Moving Forward*

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