Revolutionizing XR Experiences with the Power of the Edge

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MobiledgeX
MobiledgeX is creating a marketplace of edge resources and services that will connect developers with the world's largest mobile networks to power the next generation of applications and devices.
Current State

DEVICES

3.7 billion devices

NETWORKS

1.7 Trillion USD
CAPEX last 10 years

(mainly used as bit pipe)

CLOUD

300 Billion USD
CAPEX last 10 years
Emerging new class of applications
Pervasive and Immersive

Yesterday
Device: PC
Interaction: Web based
Content: Primarily static

Today
Device: Smartphones/Tablets
Interaction: Web/App based
Content: Increasingly video

Tomorrow
Device: Smartphone/Tablets, IoT, Next-gen
Interaction: AI-based, Natural Interface, Machine
Content: Video heavy, Interactive, Latency sensitive, High IO

π apps = PI = Pervasive & Immersive
Inefficiencies and Obstacles for Developers

**DEVICES**
- You don’t know what is possible

**NETWORKS**
- You have to know somebody
- You have to figure out the business model every time

**CLOUD**
- Your idea isn’t big enough fast enough
- All transformations are for internal customers

NO HELP
Client is mobile – Cloud is static

Static and geographically distant cloud
Client has become mobile but backend is still location unaware and static
There is a better way

Device Native

Zero Touch

Cloud Native
Live in production in Germany

World’s First Public Mobile Edge

Introducing MobiledgeX Edge-Cloud R1.0

MobiledgeX Edge-Cloud R1.0 enables application containers to be deployed with the same simplicity as over-the-top, hyperscale datacenter-based cloud providers. The product powers compelling new use cases already live in networks today, including:

- Automatically deploying application backends close to users based on their Verified Location and Identity
- Augmented Reality and Mixed Reality Performance Support
- Video & Image Processing That Meets Local Privacy Regulations
World’s First Mobile Edge Mixed Reality Multi-Gamer Experience

- **2,000+ visitors** to multi-player AR game demo with Niantic & Samsung (#1 traffic in Deutsche Telekom’s booth)
- Executives from **more than 15 operators** played the game & experienced the developer console
- More **than 25 articles** mentioned the demo
Better responsiveness for massively scalable multiplayer/AR games

**Game Platform Services**
Provide meta-game functions such as multiple players joining the same dedicated game server instance or holding the “friend list” social graph.

**Dedicated Game Servers**
Provide the game logic. To minimize latency client game apps communicate directly with the dedicated game servers (L4/UDP).

**Analytics Stack**
An important component of modern games, stores and queries analytics and gameplay events. Telemetry goes to a common collection point (Hadoop).

**Game Database**
Often games begin with a single relational database that is then scaled up and eventually replaced by a database service layer built on top of NoSQL databases.

**Game State**
Persisted in the system of record and typically stored in the game database.

MobiledgeX, Samsung, Niantic, DT
MobiledgeX Edge-Cloud

DEVICES

Native Device Support

NETWORKS

APIs
SDKs
Distributed Matching Engine

CLOUD

Edge-Cloud Controller
Cloudlet Resource Manager
Cloudlet Compute Resources
Public Cloud

Distributed Federated Planet Scale Kubernetes
Three Technical Pillars

- **Bringing Cloud Closer to Users/Devices**
- **Managing Privacy: Federated, Distributed, Planet Scale Container Orchestration System**
- **Safer Edge with Trusted Users, Applications and Networks**

Edge-Cloud Offers a per country architecture for addressing country-specific data privacy laws while offering a global marketplace and single pane of glass to developers.
Bring cloud closer to device
Make backend Mobile

Cloudlet X
Cloudlet Y
Devices Group and work together
Device and Dynamically Discovered, Grouped & Controlled
Managing Privacy
FEDERATED DISTRIBUTED PLANET SIZED KUBERNETES

Global, Homogeneous

1

Distributed Federated Global Control Plane:
Global required data – Developer enablement, introspection, settlement, developers, global policies, applications registry.

100’s

Distributed Zonal Control Plane:
Country required data – local policies, devices/users, compliance, governance

100,000’s

Cloudlet Assurance, Integrity and Governance:
Operational required data – device specific data, status, instantiation, performance, usage,

Local, Heterogeneous

20-100M Devices Across the Planet interacting with the system at any given time. Creating services using devices, networks, clouds as one global entity with federated policies and local compliance.
Building a Safer Edge Architecture

Homogenous
- Find Cloudlet
- Verified Location
- Register

Application Modernity
- DME Distributed Matching Engine
- CRM Cloudlet Resource Manager
- Kubernetes API Server
- APP1 Container(s)
- APP(n) Container(s)
- APP1 KBs Cluster
- APP(n) KBs Cluster

Heterogeneous
- Standard Server Hardware Infrastructure
  - CPU, GPU, RAM, Flash, HDD, NIC

Physical Facility
- Operating System & Drivers
- Compute + Accelerators
- Networking
- Local Storage
Developers Communities & Open Labs

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<thead>
<tr>
<th>THE LINUX FOUNDATION</th>
<th>TELECOM INFRA PROJECT</th>
<th>hub:raum</th>
</tr>
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<tbody>
<tr>
<td>Why MobiledgeX? To drive the correct approach, delivery and industrialization of a distributed federated control plane.</td>
<td>Why MobiledgeX? To ensure accessibility and maximum utilization potential from the perspective of market demand.</td>
<td>Why MobiledgeX? To get early market access to potential demand and needs and ensure delivered edge services meet those needs.</td>
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MobiledgeX is not a direct member, but is participating via Deutsche Telekom to showcase certain edge use-cases with other operators.

Why OEC? Academic partnership and consolidation of industry players to best understand what is possible/needed.

Why MobiledgeX? Access and participation in edge computing knowledge, value, learnings.

Why WWT/Advanced Technology Lab? Certify vendor infrastructure configs that can then be delivered with industrial scale and cost.
Thank You!

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