



Building a Better Connected World in Digital Economy

“Open, Collaborative and Sharing”

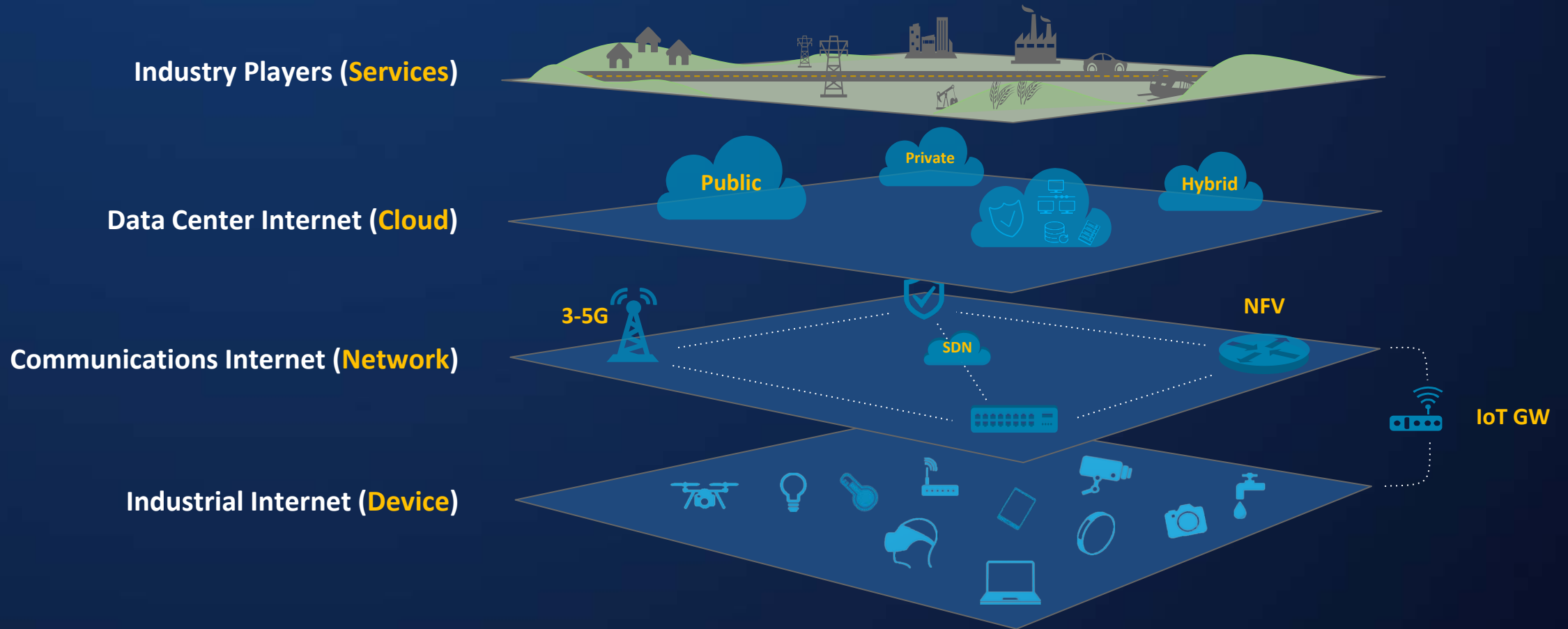
Dr. Sanqi Li

CTO, Huawei Products & Solutions



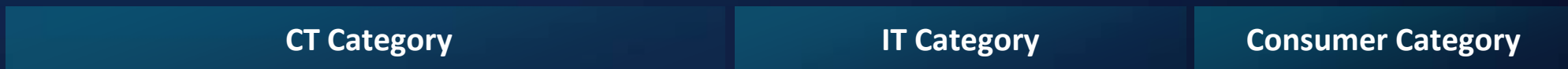
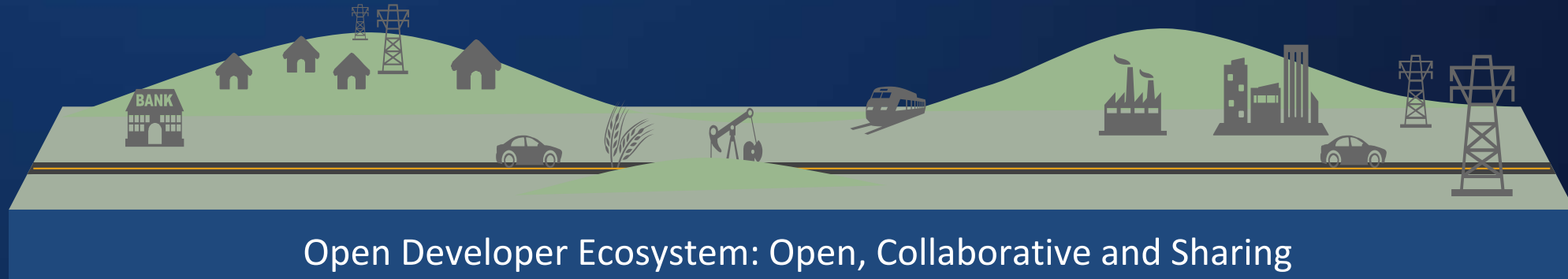
ICT Cloud Transformation

Foundation of Next Digital Revolution



Platform Revolution

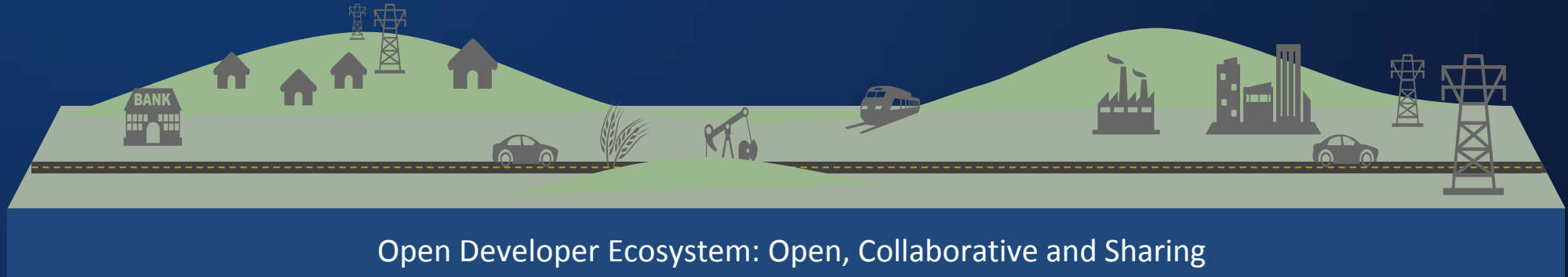
In ICT Cloud Transformation



Platform Initiatives Product Portfolios

Platform Construct

Consisting of Many Open Source Components





Building Open Source Ecosystem

Huawei Leadership Position





Key Platform Ecosystem Play

Huawei Long Term Commitment



Huawei Developer Forum:

10K+
Attendees

Huawei Developer Congress
Shenzhen Oct. 2015

\$1B

5 Year Investment In
Huawei Developer
Enablement Plan

Open Lab Partner Program:



Forming emerging solutions:
SDN/NFV, ICT, cloud services,
IoT, IoV, NB-IoT

Business Solution Alliance:



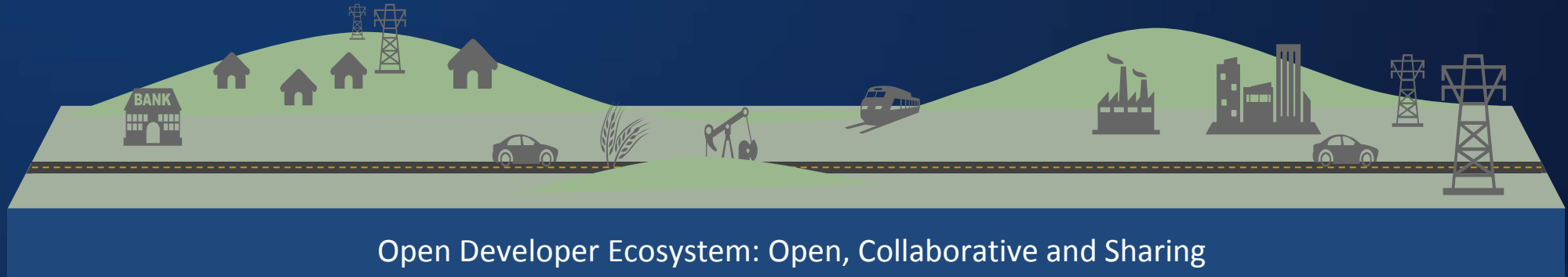
Focus on ICT infrastructure to
empower partner's value creation



Inspire, engage and align all
stakeholders with agile, lean
and adaptive execution

“Platform + Product” Solutions

Huawei Early Business Success



FusionSphere / FusionStage



- ❖ 2500+ deployments, 1.4M VMs
- ❖ 250+ cloud DCs in 100+ countries
- ❖ Huawei Public Cloud in China
- ❖ Open Telekom Cloud in Germany

Agile Network & CloudEdge / CloudCore



- ❖ 60+ joint innovation projects
- ❖ Engage 20+ lead carriers
- ❖ 9 commercial deployments

FusionInsight



- ❖ 200+ commercial customers
- ❖ 500+ projects

IES



- ❖ Engage 5 lead carriers



Overview of Huawei Four Platform Initiatives

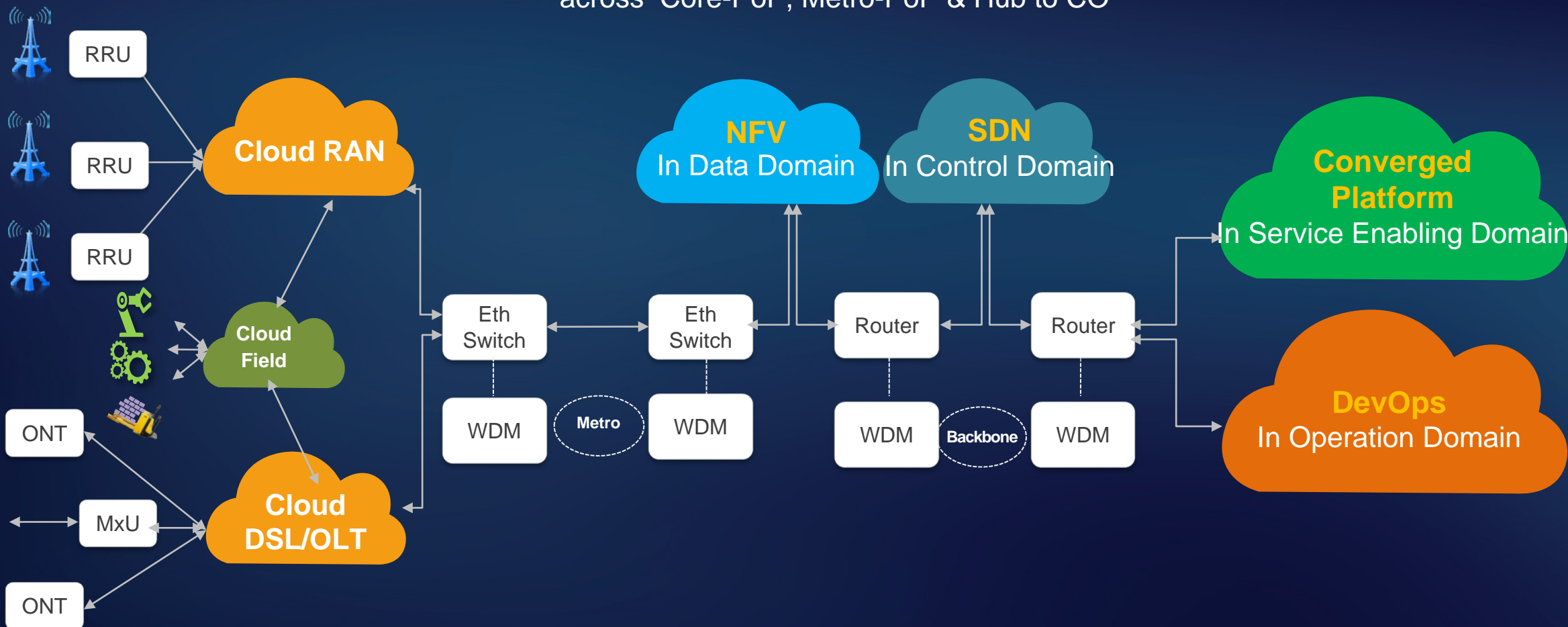
- **SDN/NFV Platform**
- Big Data Analytic Platform
- Open Video Platform
- IoT Connectivity Platform

SDN/NFV Platform: Transforming Telco Network to Cloud

Eventually penetrating to End CO

Largely distributed into network infrastructure across Core-PoP, Metro-PoP & Hub to CO

Highly concentrated at DCs



Journey of Software Defined Network Evolution

2010: Software Abstracted Network

Open Flow

- ✓ Decouple control from data
- × Focus on SB API
- × Green data center only
- × No migration path

2012: Software Controlled Network

SDN Controller

- ✓ Unify NB and SB APIs
- ✓ ODL and ONOS Ecosystem
- ✓ Support overlay, underlay & hybrid network devices
- ✓ Control + Config domains with adapters to Legacy
- × Limited data modeling
- × Centralized State
- × Weak distributed framework

2015 +: Software Operated Network

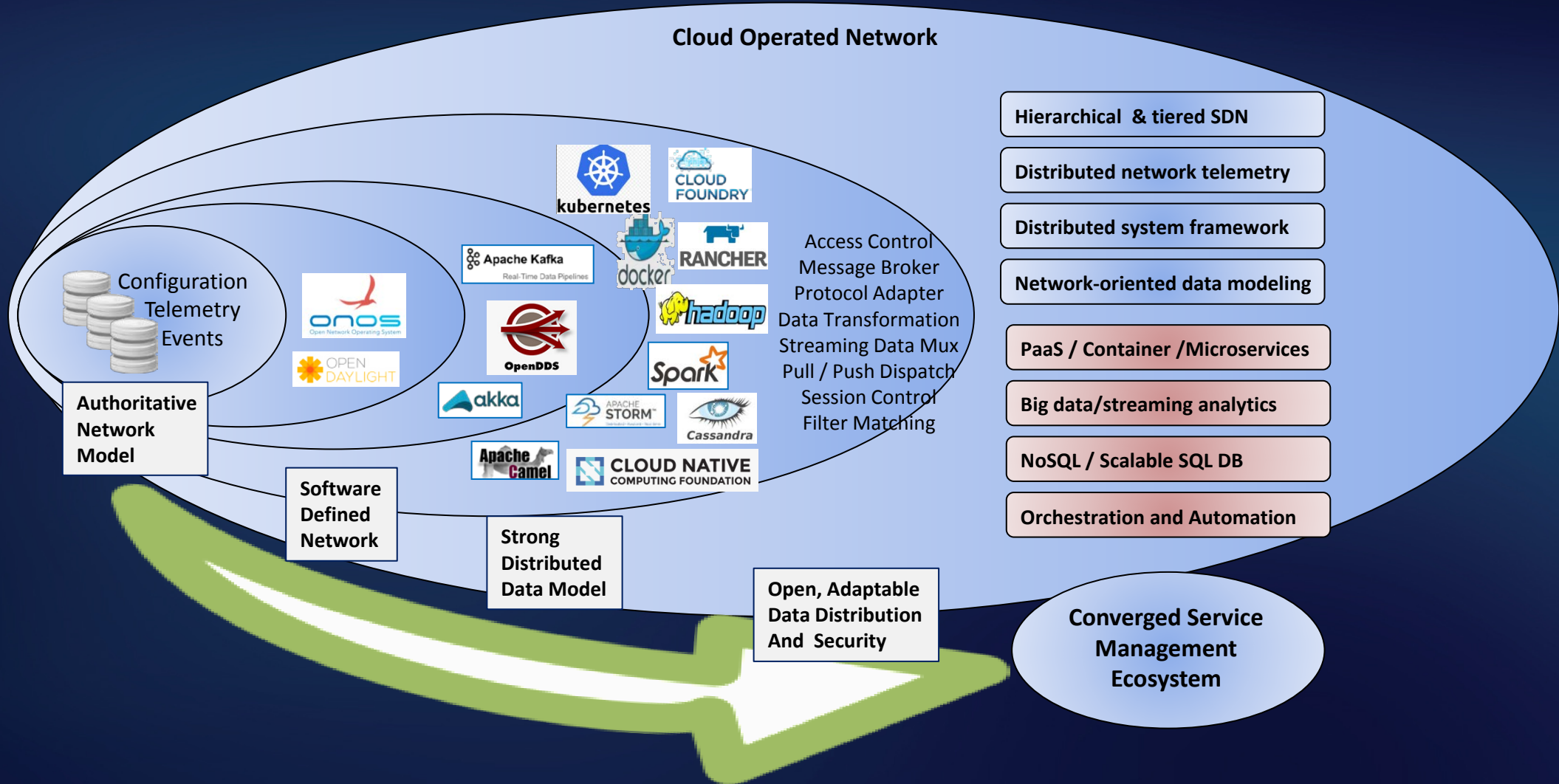
Next Challenges

- Hierarchical & Tiered SDN Architecture
- Distributed Network Telemetry framework
- Network -oriented big data analytics
- Declarative network data modeling
- Orchestration across layers
- Migration of distributed to centralized model
- Monolithic and Micro-services
- IoT connectivity in networks
- Leverage of distributed technology eco-system

Fundamental Challenge: Network Engineering → Software Engineering



How to Bridge SDN/NFV with rest of emerging Cloud World



Overview of Huawei Four Platform Initiatives

- SDN/NFV Platform
- **Big Data Analytic Platform**
- Open Video Platform
- IoT Connectivity Platform

FusionInsight: Huawei Big Data Analytic Engine



Bank



Telecom



Government



SME

FusionInsight

Manage Domain	Data Modeling, Algorithms & Tools			
	System Management	Solr	HIVE	STORM
	Data Governance	Arsto	APACHE HBASE	FLUME
Security Management	Spark	hadoop	Apache Kafka	

Smart

- Enhanced algorithm set
- Domain driven models

Agile

- Life-cycle management
- Open API and enriched UX

Trusted

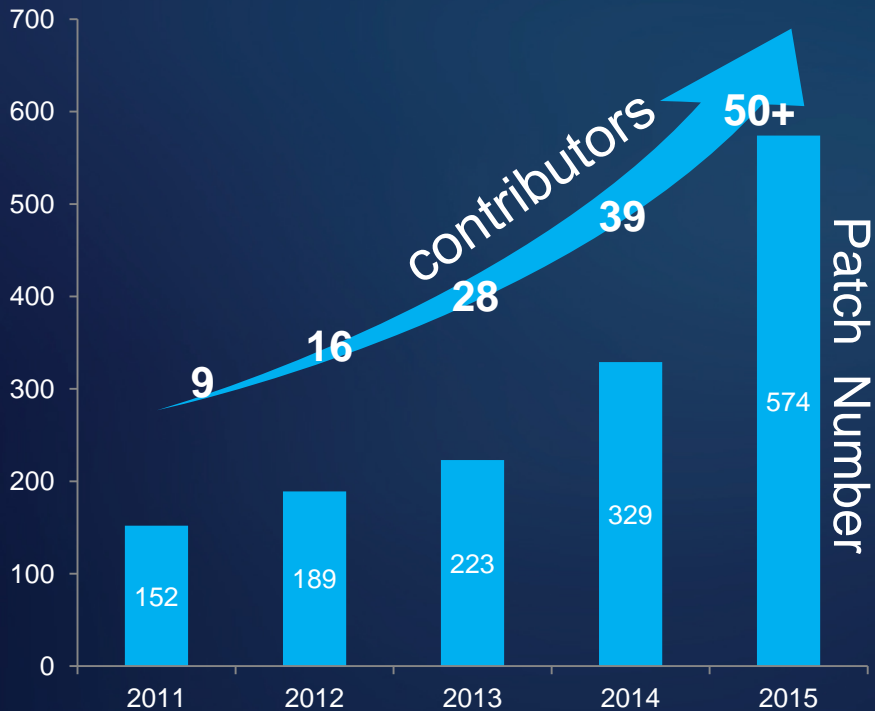
- Strengthened security
- Disaster recovery



Top 2 & 4 Contributors to Hadoop & Spark Ecosystem



Apache Huawei Contributions



Innovation

Hindex

HBase:

- Secondary index
- 3X faster query

Efficiency

SQL

Spark on HBase (Astro):

- Distributed SQL
- Analytics on HBase

Performance

5X

Spark:

- Smart Query Rules
- Optimized Cartesian join

Cost

1/2

HDFS:

- Erasure Code
- 50% cost saving

NEXT

Carbon

Spark:

- New format (Hadoop native)
- Optimized for OLAP

Shanghai Unicom Case: **Deep Engagement**

- Collaboration, Migration, Consolidation, Domain Knowledge & Co-innovation

30+ Use Cases
Across 4 Business Domains

31.3 Billion Records per Day
13.8 TB Data per day
1.9PB Storage, **60+M** Subscribers

Consolidate 9 Systems from **3** Departments
Into **1** Big Data Platform



Promotion Success Rate
Improve **6X**

Eliminate Invalid Promotion
25% saving

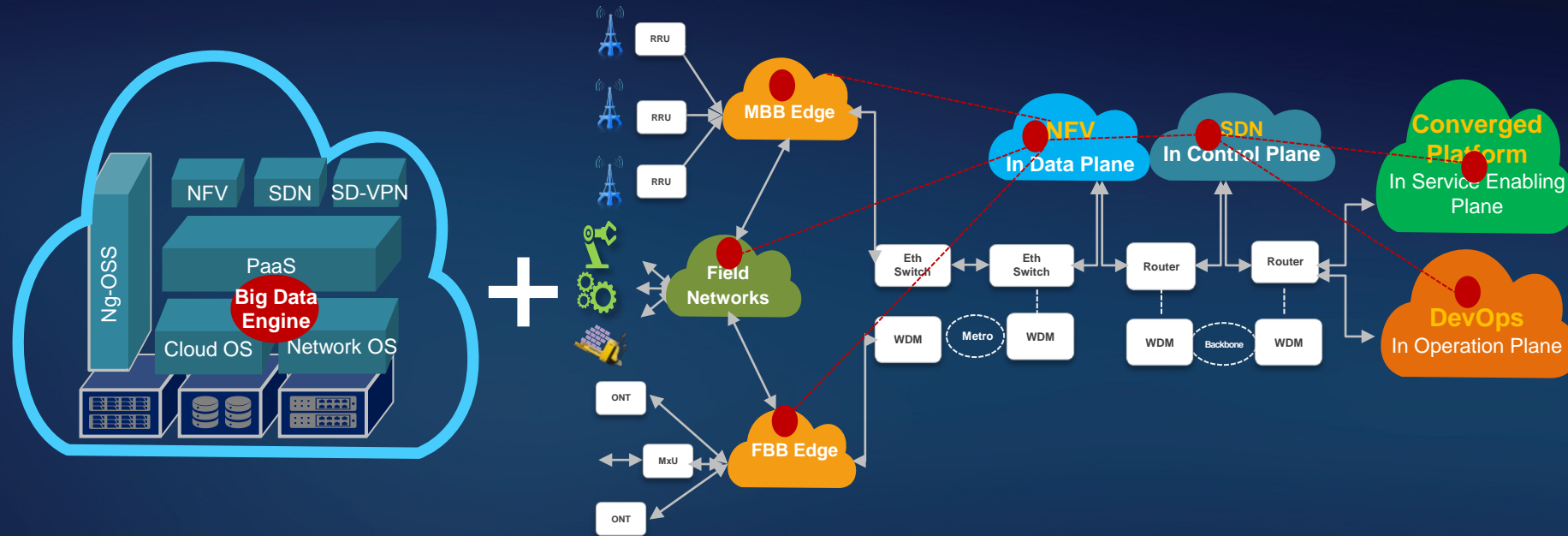
Subs Retention (Y2015)
200K Subs

Shared Data Asset
10+ Partners

Existing business Monetized Earning
\$12M

New Business Monetized Earning
\$3.2M

Data Analytic Driven Network: Geo-distributed & Edge Intelligent

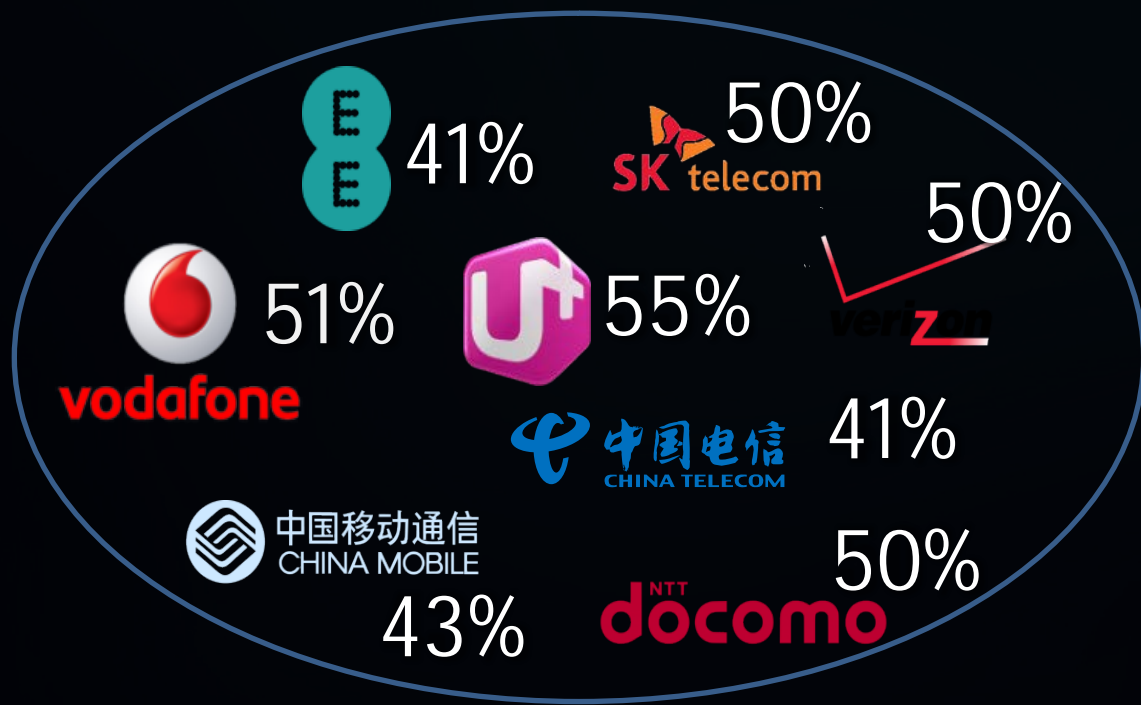


- So far Big Data analytics have not been well applied to telecom network resource optimization.
- **Missing a geo-distributed and tiered streaming analytic architecture and Network Telemetry framework**
- Toward open analytics ecosystem across data center, network edge and IoT client devices

Overview of Huawei Four Platform Initiatives

- SDN/NFV Platform
- Big Data Analytic Platform
- **Video Platform**
- IoT Connectivity Platform

Video Services become a core strategy of leading carriers



Video Entertainment



- High Definition
- Real Time
- Convergent

Video Communications



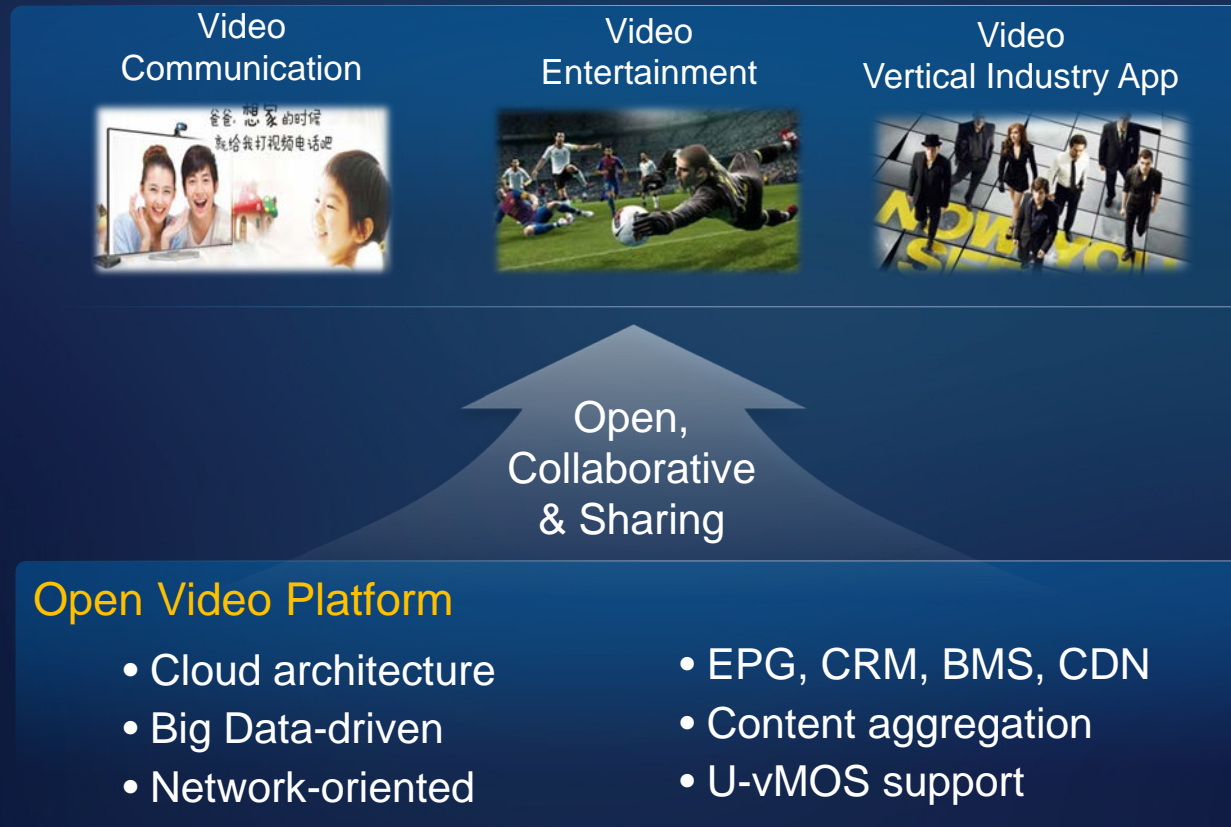
- Everywhere
- Identity
- Social

Vertical Applications



- eHealth
- Online education
- Smart city

Open Video Platform: Empowering business innovation and new value proposition in video service ecosystem



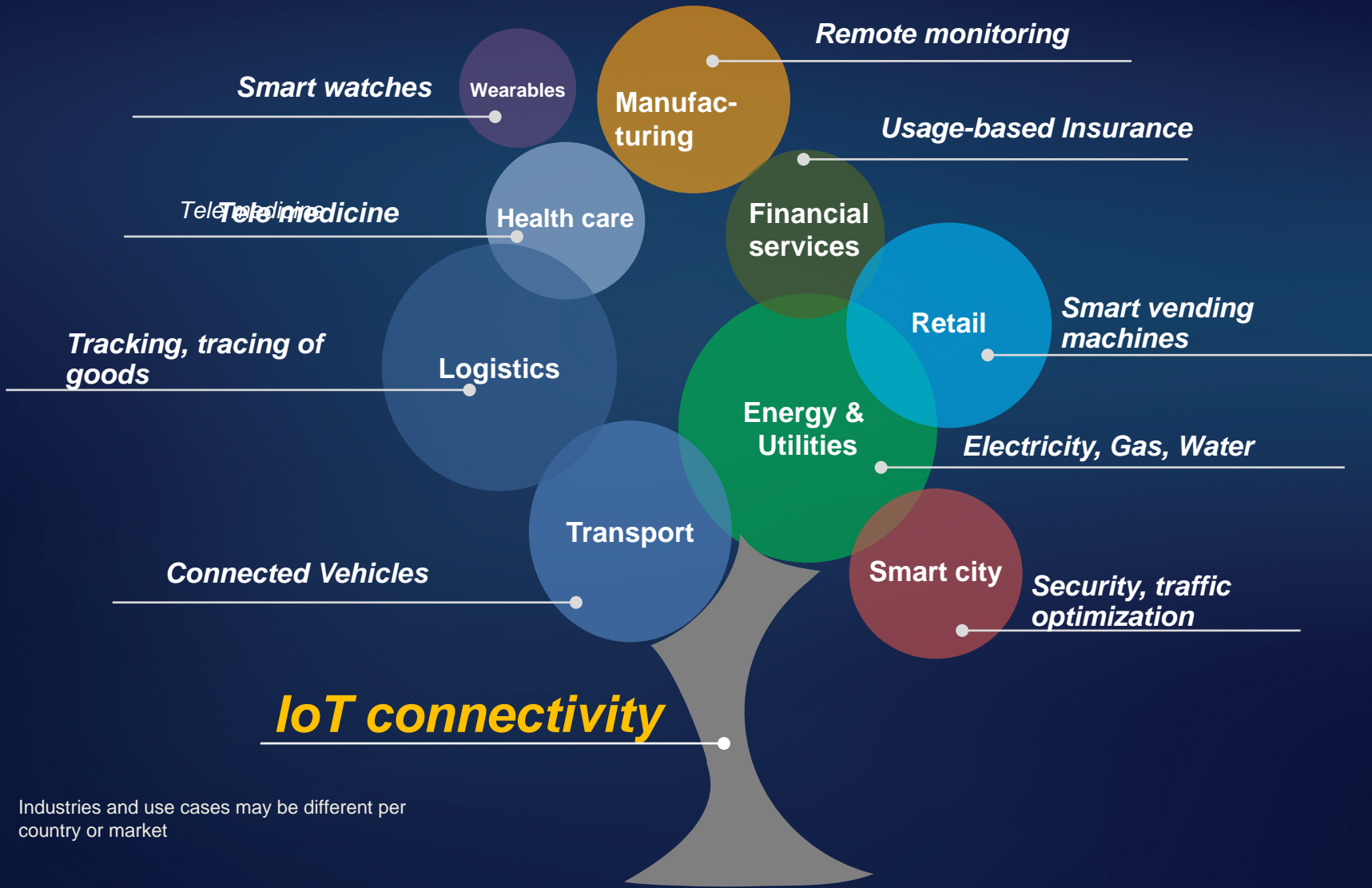
China Telecom Sichuan case since 2014:

- **Bold decision: Video as Basic service**
- **Devoted on network infrastructure for the best 4K experiences**
- **Rich content aggregation across IPTV, digital video, HD, 4K and 4G**
- **Creative business value proposition through service bundling**
- **Business success**
 - Add **5.1M** FTTH subs,
 - Add **6.9M** IPTV/video subs
 - FBB ARPU up **14.3%**
 - Monthly churn rate down by **4-20x**,
 - Add **4.3M** new mobile subs

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- SDN/NFV Platform
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- **IoT Connectivity Platform**

IoT: Impact 2/3 Global Economy



Economic impact estimates for 2025 span from USD 3.9 trillion to USD **11.1** trillion *

Understanding the **Market Dynamic** is essential to make investment decisions at the right time.

* McKinsey Global Research 2015

Industries and use cases may be different per country or market

Huawei IoT Strategy Focus: Infrastructure and Empowerment



1 Platform

IoT Connectivity Platform

2 Access Modes



NB IoT



Smart ONT



Agile AR

1 IoT OS

Huawei LiteOS/Module



Smart Home Solution: Creating Telco's New Value Proposition in Broadband Digital Transformation



IoT Gateway: Unified industrial network edge device empowered with IoT edge intelligence



Agile AR

Industrial-grade design



Abundant interfaces



Complex protocol adaptation

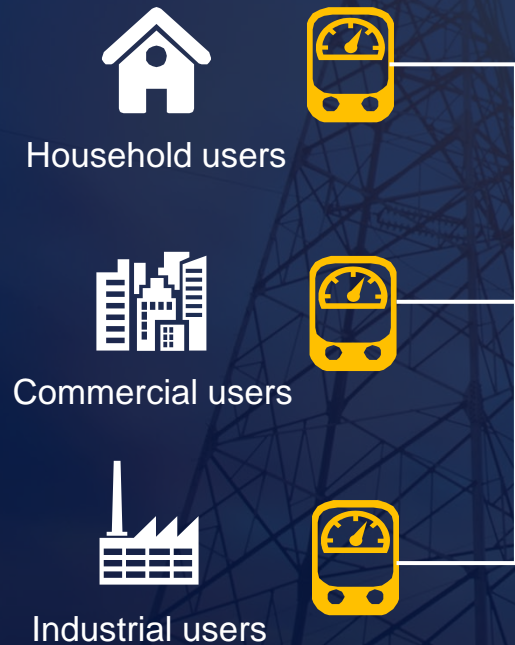
PLC, RFID, CAN, MODBUS, Wi-Fi ...



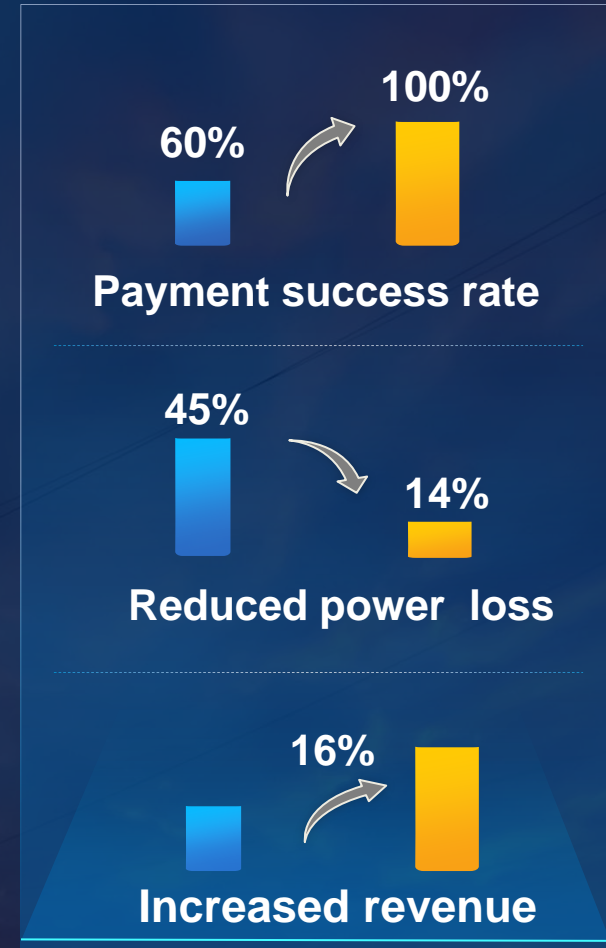
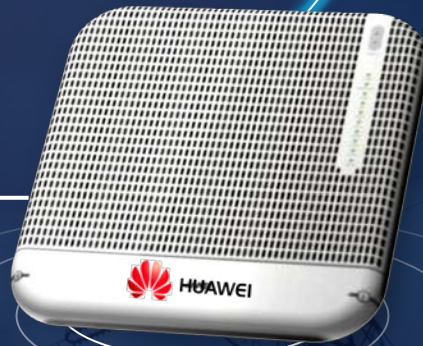
IoT Edge intelligence



Smart Ammeter Solution: Low OpEx, high revenue and better UX for utility companies



PLC



NB-IoT: Huawei pioneered technology and committed to standard with commercial global availability in 2016 Q3



10 billion connections
100K connections per cell
(100x compared to 4G)

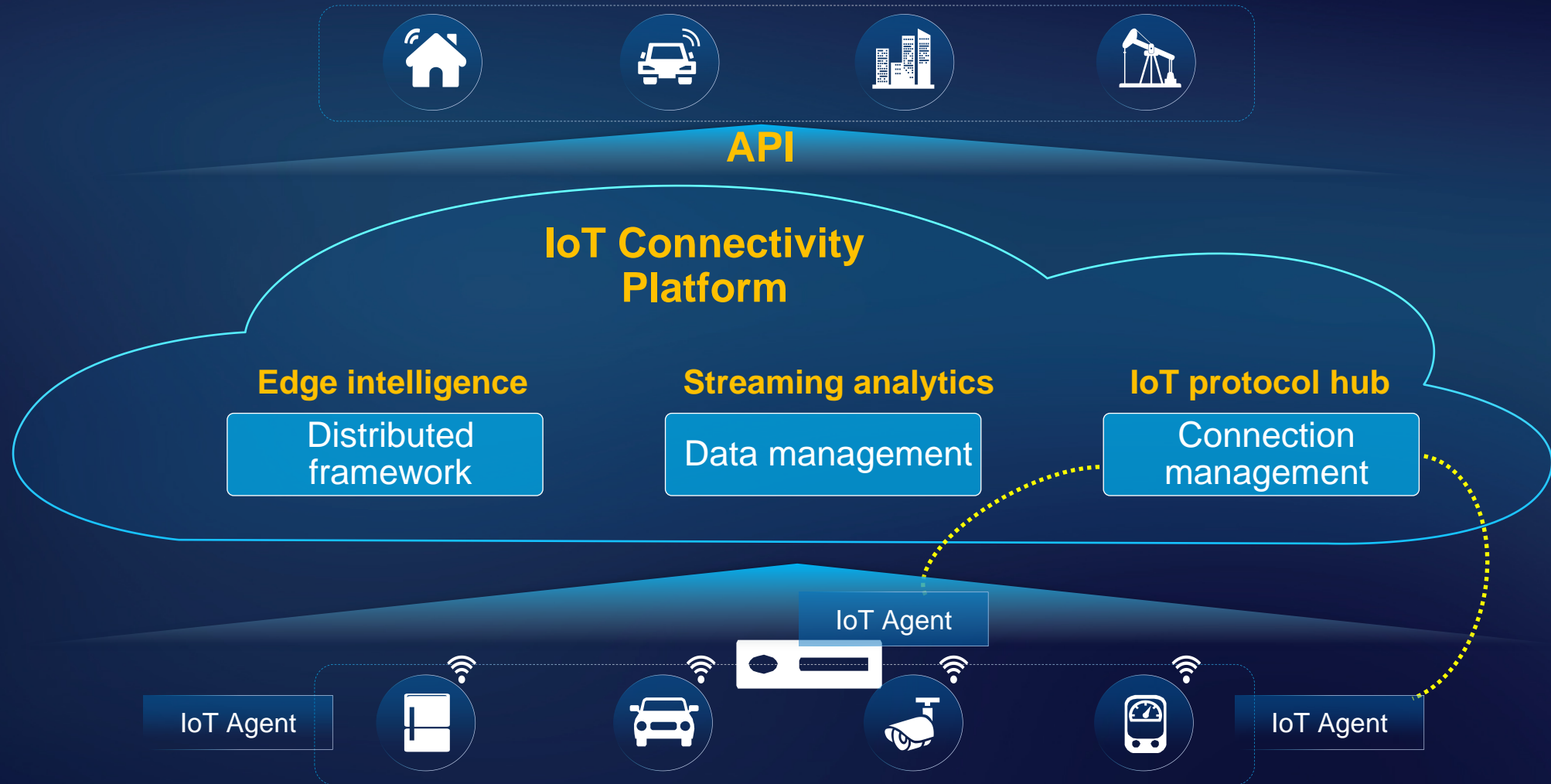


Deeper coverage
20dB+ gain (penetrate one more wall than 2G)



Low power consumption
10-year battery life

Cloud-based IoT Connectivity Platform: Accelerating digital transformation across consumer and industry space



Samples of early IoT Business Success



1,500 **ambulances** in Australia



18,000 **on-line buses** in China



100k+ **Gas Stations** in China



16,000 video surveillance points for **safe-city** in Hefei, China

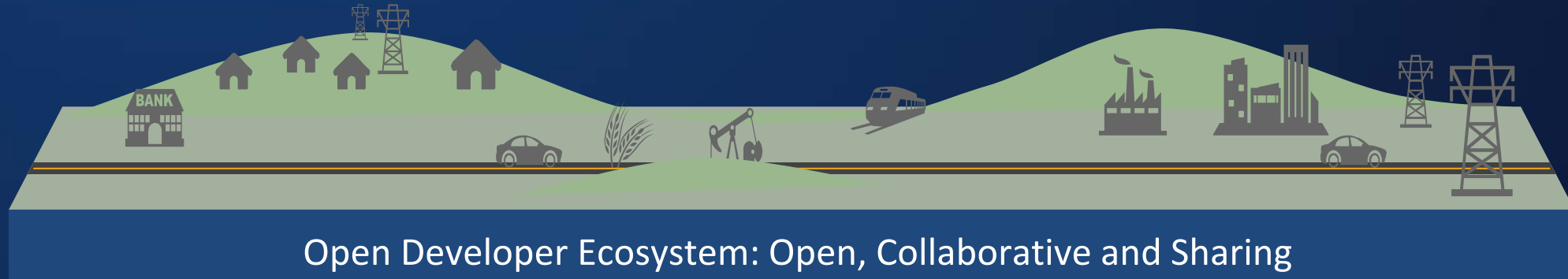


120K+ **electric water heaters** in South Africa



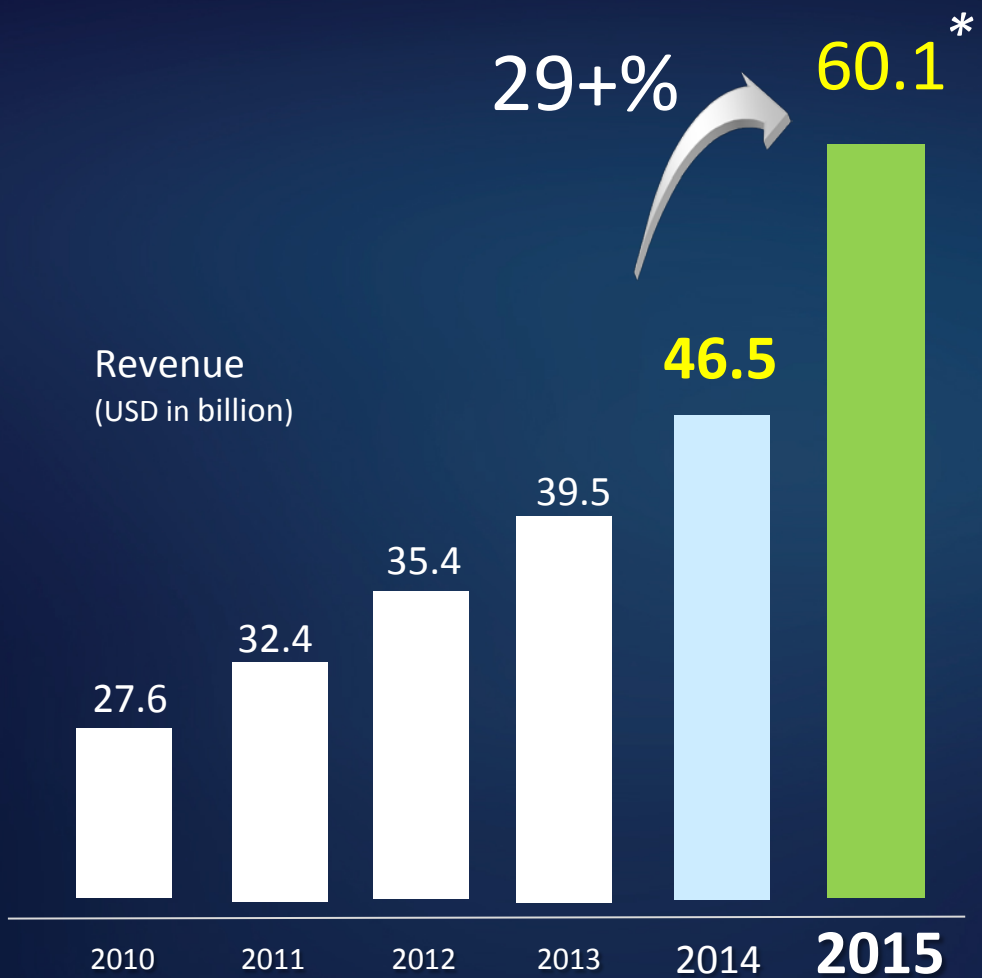
30K **LED street lamps** in Czech

Summary: Embracing ICT Cloud Transformation

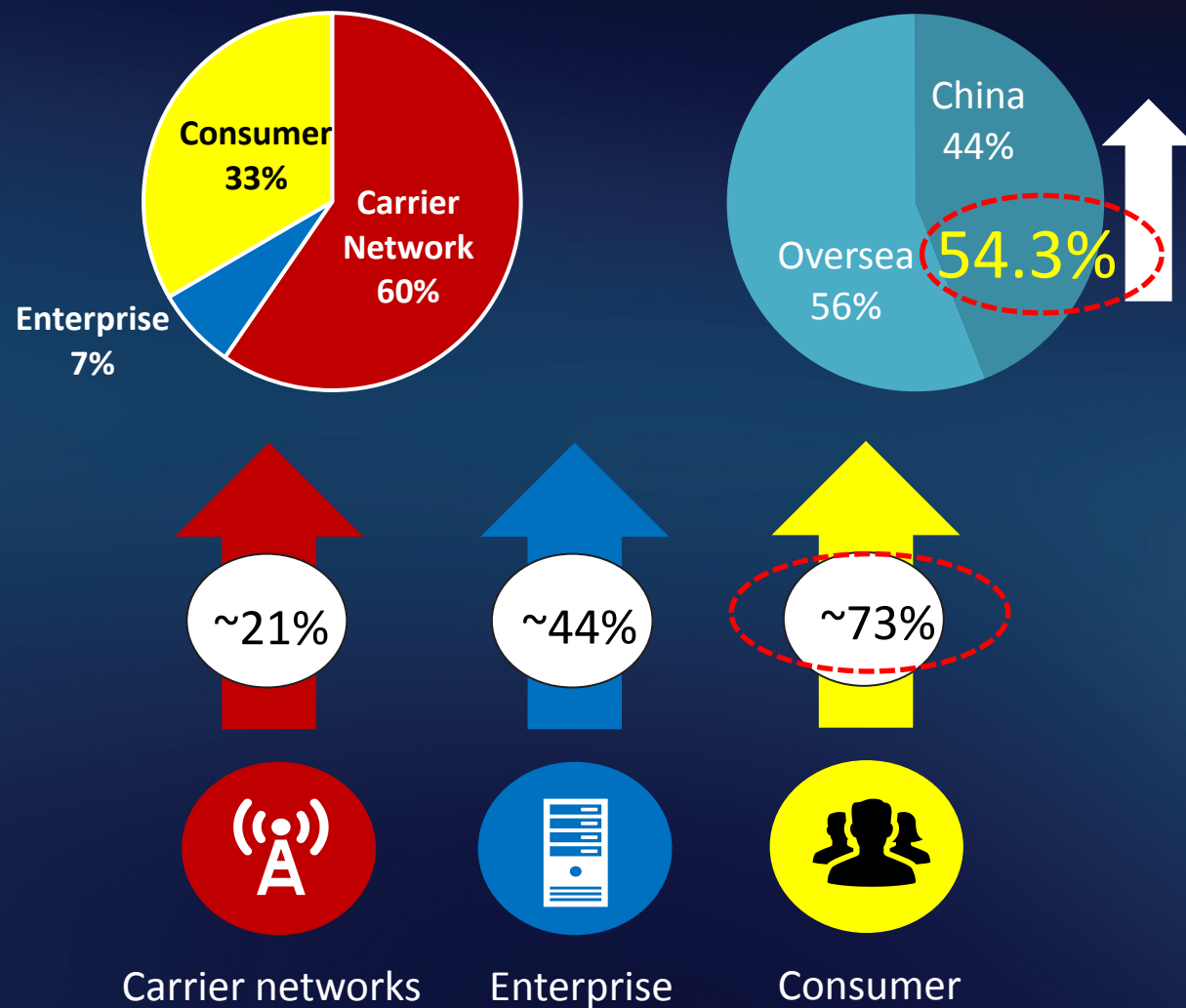


Platform Initiatives
Product Portfolios

Performance Update

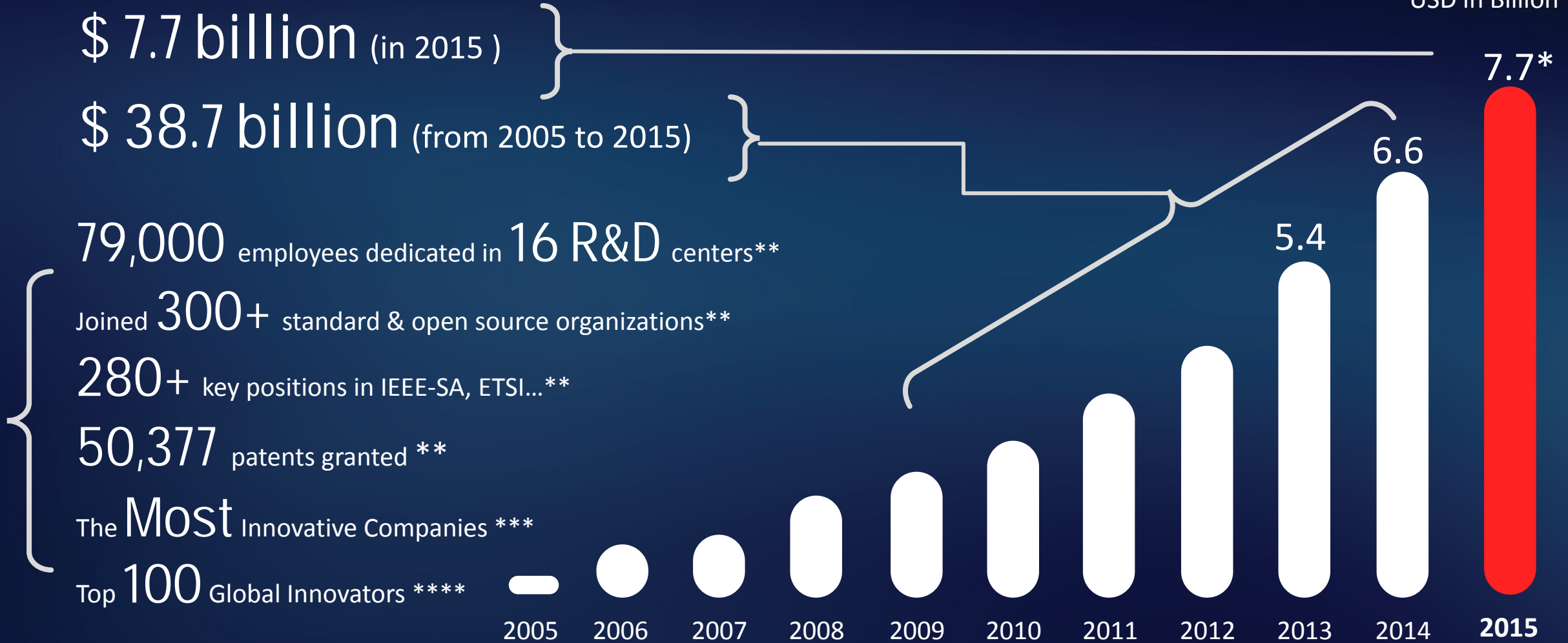


• Internal estimate, not audited yet



Long Term Commitment to R&D Investment

USD in Billion



*: Internal estimate, not audited yet
 **: As of Dec. 31, 2015
 ***: (Boston Consulting Group 2014)
 ****: (Thomson Reuters 2014)

THANK YOU

