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Internet of Things

IoT brought to life

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While the past has been about connecting people, the future is about connecting things – improving personal life, optimizing business processes

The programmable world improves people's lives through automation, enhanced connectivity and intelligence. It also helps industries to become more efficient, agile and real-time.

- Fixed internet with 1 bn places connected by 2005
- Mobile internet with 5 bn people connected by 2020
- Programmable World with 50 bn things connected by 2025

Attractive business models and a myriad of use cases will expand the human possibilities

Of fatalities in car accidents are due to human error and slow reaction, majority to be avoided by 100% reliable connectivity and assisted driving

90%

Of the 355 billion gallons of water used by Americans daily are wasted due to leakages

20%

Fatalities each year worldwide by not following doctor's prescriptions – addressable by assisted living / patient monitoring

1 million

Estimated energy waste in US buildings due to inefficient and outdated HVAC systems

50%

Additional economic benefits for governments by leveraging Smart City applications

50 billion €

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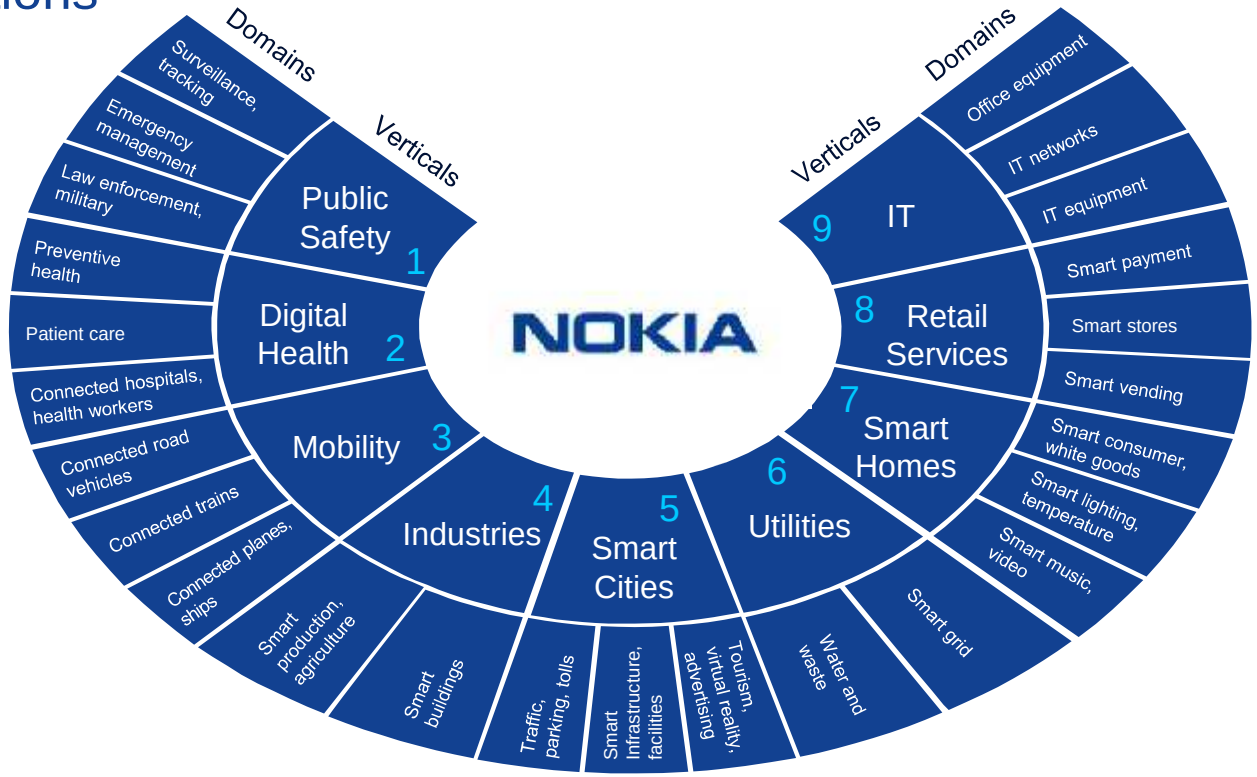
The Internet of Things has a transformational impact on all industries, re-shaping business models, value chains, and entire industry configurations



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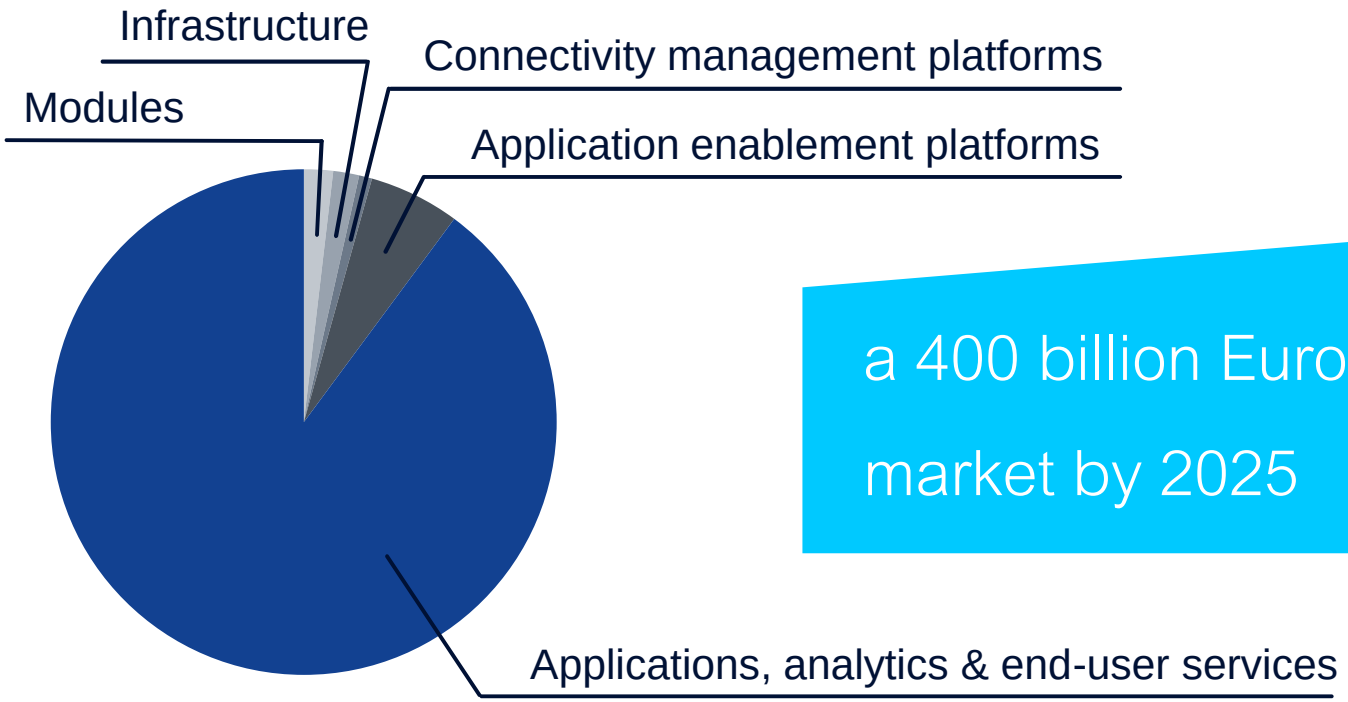
The IoT provides an unprecedented opportunity for hardware, software and services players in telecoms, IT and electronics



a 400 billion Euro market by 2025

Source: Machina Research and Nokia Strategy, 2015

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The network can make or break the IoT

Within the next 5 years, more than 90% of all IoT data will be hosted on service provider cloud platforms.

90%

Within 3 years, 50% of IT networks will transition from having excess capacity to handle the additional IoT devices to being constrained.

50%

By 2018, 40% of IoT-created data will be stored, processed, analyzed, and acted upon close to, or at the edge, of the network.

40%

Within 2 years, 90% of all IT networks will have an IoT-based security breach.

90%

Source: IDC, December 2014

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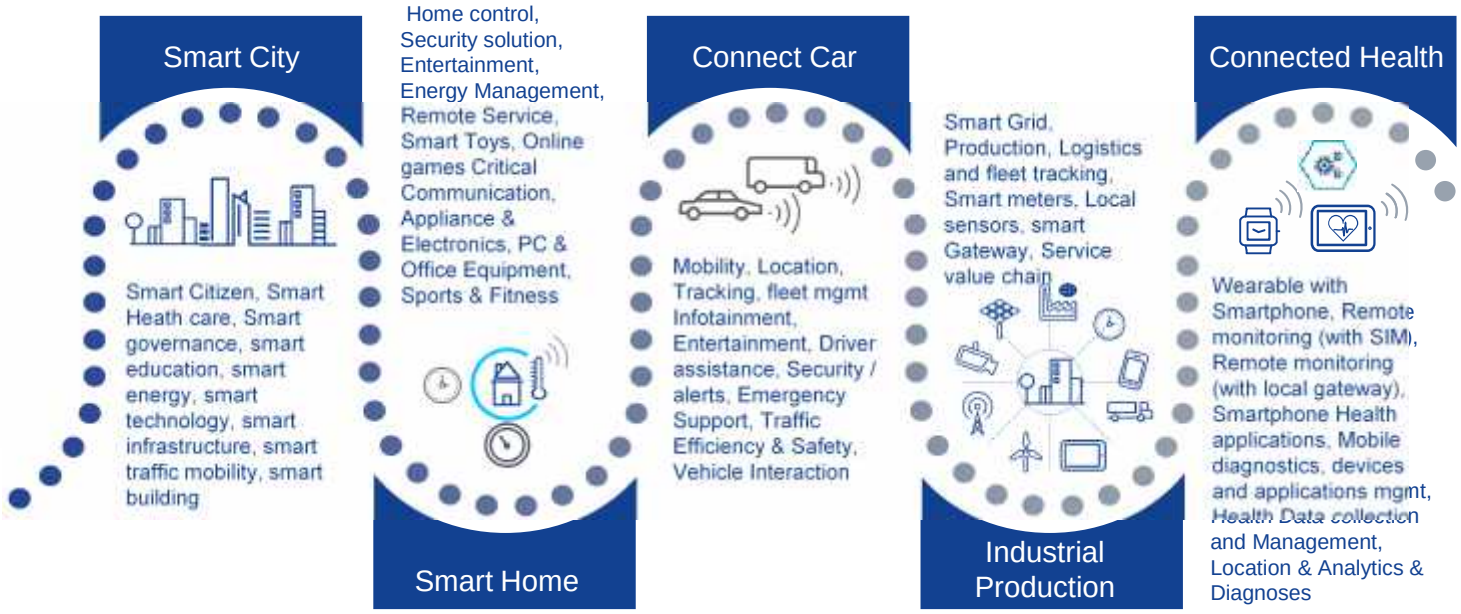
IoT Service diversity and Traffic Patterns

IoT Service diversity requires thought leadership in transforming product vertical into service vertical and build an “Optimized” IoT connectivity solution

Connectivity & service usage pattern varies across IoT verticals

- Connectivity
- Mobility
- Session
- Throughput
- Device Power
- Services Quality
- Latency



Nokia IoT vision: Connected mobility saving lives, time and air quality

Real-time analytics and actions

- Vehicle hazard warnings in milliseconds
- HD location updates and situational awareness for intelligent vehicles
- Automated traffic/parking steering, monitoring and enforcement

Higher safety, fewer jams, cleaner air

- Reducing traffic accidents on the road with assisted and autonomous driving
- Less time spent in traffic jams and looking for parking
- Significant reduction of pollution

Nokia IoT vision: Lower costs, higher production and business model transformation through industry predictive maintenance

Failure prediction and prevention

- Sensor connectivity
- Analytics and AI for identifying data patterns and predicting failures
- Automatic configuration adjustments
- Preventive maintenance

Transforming businesses

- Significantly reducing production outages and/or maintenance costs
- Enabling new business models, e.g. from low-value product sales to high-value performance assurance

Nokia IoT vision: Create a convenient, safe and simple home
Turn your ONT into the Smart Home hub

Combine connectivity with smart home services and reduce customer churn

HOME AUTOMATION
Create use cases to make the home self aware

HOME SECURITY
34B€ worldwide market

HOME MAINTENANCE
Be notified of potential leaks, smoke or high water levels

ENERGY MANAGEMENT
IoT can make smart homes **40%** more energy efficient

E-HEALTH
Potential savings, just in North-America, **$300B** per year

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Security for Internet of Things – Malware detection

Mobile Guard

- Security Insight (Dashboard) — NOKIA
- Action Engine (automated actions) — NOKIA
- Malware intelligence DB
- Correlation of traffic patterns — NOKIA

- Telco-centric dashboard for IoT and end user devices
- Uses Telco data for detection and automated mitigation
- Detailed real-time information about infected devices

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To fully capitalize the Internet of Things opportunity, five main challenges have to be addressed

Robust connectivity: Latency, availability, coverage

1

Standardization: Standard connectivity for billions of things

2

Interoperability and open interfaces: Enabling platforms to talk with each other

3

Privacy and security: Prevent malware injection and data misuse

4

Domain knowledge: Deep, vertical-specific insights

5

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