Opportunities of Vodafone Innovation Campus and Narrowband IoT Open Lab

Success through Cooperation

谷　伸一
IoT、APAC
グローバル・プロジェクト・マネージャ
ボーダフォン・グローバル・エンタープライズ

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Our Partnership -

Digital City Düsseldorf

Digitale Stadt
Düsseldorf

Digitale Stadt Düsseldorf

Business
Networking
Way of Life

Digitale Stadt
Düsseldorf

Digitale Stadt Düsseldorf: The Network

Communications - Networking – Industrial Diversity

The Digital City Dusseldorf connects the industries of the future information and communications technology (ICT) with traditional sectors. More than **280** companies from Dusseldorf and surrounding areas have come together in recent years within the network.

Digitale Stadt Düsseldorf

Digitale Stadt Düsseldorf: The Network

Stephan Schneider
CEO

Senior Manager, Vodafone Germany

Digitale Stadt Düsseldorf
BECHTLE
ABE
AENGEVELT
Bundesagentur für Arbeit
Agentur für Arbeit Düsseldorf
ASSIST
eConvolution
QSC
Academic
aurenz
AXIANS
Hilker
B·B·O·R·S
Bird & Bird
anders.beraten
Atos
KOLAN
LINDNER
DÖRES.
onecommunication
it-living
net-m
BULL
Capgemini
PC-COLLEGE
ENGEL CONSULTING
HUAWEI
B&S
E&R
LEXEA Rechtsanwälte
appseleration
EMBA
Net 2000
controlware
cisco
cassini
KELLNER TELECOM
Deutsche Bank
Canon
eunetworks
rh r. heitjans
locatesolution!
comebis
tennagels
EU FH
MH CONSULTING
Diakonie
FPS
DAMOVO
CONSULT
codecentric
acctopus
eConsult GmbH
RALF SCHMITZ
Deloitte.
DIGITAL DISTRICT. WIRKUNG.
Compuware
software
DTP AKADEMIE
Creditreform
Deutsches Rotes Kreuz
bertrandt services
KANZLEI KÖTZ FUSBAHN
ERICSSON
FH D
ERGO
easynet
DataLab.
cewe
UC Point
EQUINIX
P2 medien
FOM Hochschule
eurowings
vitaliberty
Düsseldorf Airport
DUS
AVP
savills
GAHRENS & BATTERMANN
FINANZPLANER TV
SPIRIT/21
FERCHAU ENGINEERING
NETZTECHNIK
DATEN_PARTNER
GENEVA
hp
reinisch
Allianz
Global Knowledge
sektor
htc
MBA
SONY
E-PLUS GRUPPE
langendonk creative consulting
RDS
INHAUS
Hochschule Niederrhein
ElectronicPartner
pwc
KT
integrata
HOCHSCHULE FRESENIUS
dotkomm
GESS
Johnson Controls
ZTE中兴
DTO Research
aruba
it-netze
smart media pro
INNOFACT AG
IT-ON.NET
Tideum
CODE ONE
IHK
konzept park
ROCKETHOME
Level(3)
KAASA HEALTH
LANWORKS
Landeshauptstadt Düsseldorf
SITA
LOGICALIS
MEDIAAN
MD.H
NUANCE
KÜMMERLEIN
Raritan.
neofonie
klan9salon
TVM2
Messe Düsseldorf
MITEL
m3 connect
NETTWERK
Qentinel
mubaloo
NOKIA
na-news aktuell
NEC
nextraOne
NGN EUROPE
OEV
MOTOROLA
dacoso
NetApp
Nexans
Reply
ProTeam
UNISYS
sunzinet
CIOCIOLA
netzTeam
netage solutions
mesh
LEINEMANN PARTNER RECHTSANWÄLTE
PEERING GmbH
kometex
tec
impatto
MITSUI & CO. DEUTSCHLAND GmbH
pallas
Power Folder
NÖRR STIEFENHOFER LUTZ
PANDUIT
L&B Solutions GmbH
WISAG
CS Campana Schott
schwannverlag
BlackBerry
Work and Vision
Smartcheck
Cumulocity
Rheinbahn
inovex
SECURITAS
NETZTECHNIK
Zülow
TÜVRheinland
Capturemedia
SIEMENS
Ontaris
TDS
trivago
Sana Kliniken Düsseldorf
TELBA
StepStone
proDialog
TWINSOFT
SSM gruppe
ubisys
SK.NET
Microsoft
TaylorWessing
FORCE
STUDIENIN
Stadtsparkasse Düsseldorf
SEVEN PRINCIPLES
Business Brothers
univativ
xevIT
WFMG
Stadtwerke Düsseldorf
DriveNow
SAMSUNG
TOUGHSTAFF
vodafone
hello, technology
UID
SV Group
ACP
SIGMA
tellabs
aufrecht.de
STRÖER
RICOH
trivadis
druckstudio
SYBASE
PUNK
VALUEDFRIENDS
valido
UNIFY
RSA
TOSHIBA
Convista
aruba
SMARTHOME
uniscon
richtwert
CLINICALL
widjet
DST consulting
Xengoo Campus

SMART City Duesseldorf

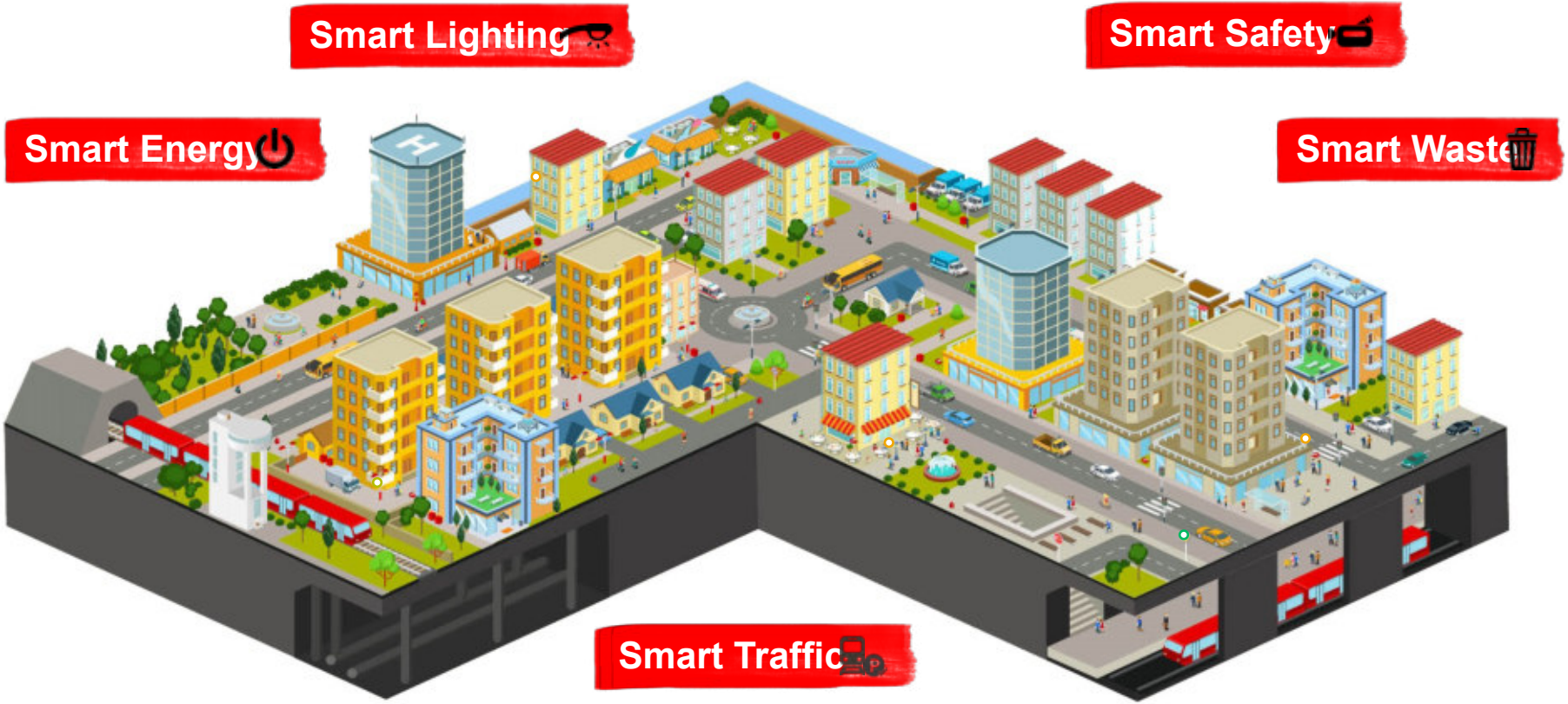
Powered by Vodafone

Examples: implemented topics within Digitale Stadt Düsseldorf

- Rheinbahn App (Tram)
- Politessen-App (local Police Officers)
- Street Observer (Asphalt-Damage Registration)
- Food Administration (online Register)
- Supplier Airport Düsseldorf (u.a. WLAN)
- WDZ*: Telemedical care for diabetes patients worldwide

* = Westdeutsches Diabetes Zentrum

Vodafone Smart City Portfolio



Smart City @Cebit: The „Merkel & Abe - Case“

Three topics presented:

- Smart City Lights
- Smart Waste
- Connected Mobility

Experience it yourself at Vodafone Campus in Düsseldorf!

Vodafone Innovation Park

Vodafone Innovation Park

https://www.vodafone.de/innovationpark/en/discover-vodafone-innovation-park.html

Click HERE to see the video

A Tailor-Made Ecosystem for Your Testing Purposes

Realistic end-to-end environment with three of the most important network equipment vendors on site

Variety of dedicated test scenarios possible, e.g. battery consumption measurements under different coverage scenarios

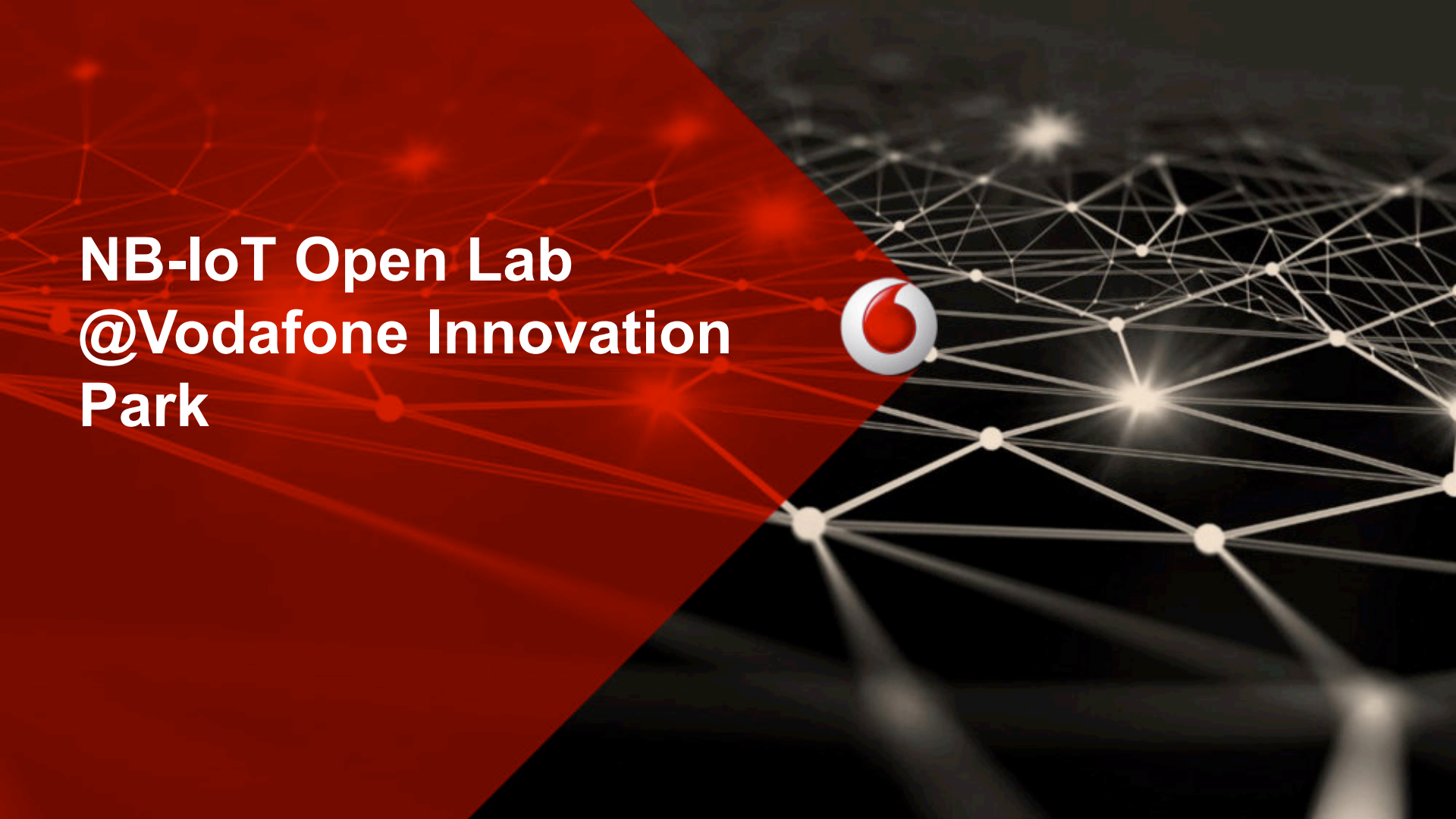
Professional Certification Services against standardised network features

Connectivity to external servers and possibility to host customer servers and applications

Open for all interested parties

Vodafone Innovation Park

NB-IoT Open Lab @Vodafone Innovation Park



NB-IoT Multivendor Open Lab

The NB-IoT Open Lab in Düsseldorf, Germany is the world's first multivendor NB-IoT Open Lab and is operated in partnership with Huawei, Ericsson and Nokia.

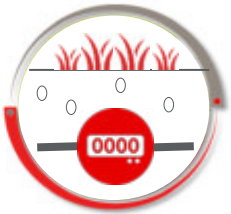
The Open Lab provides a simulated real time environment for application developers and device, module and chip manufacturers to test their products. This accelerates their time to market for NB-IoT devices and services. It also allows device manufacturers to verify that their products meet the exceptional sensitivity and battery life performance requirements for NB-IoT devices.

What is LPWA?

LPWA

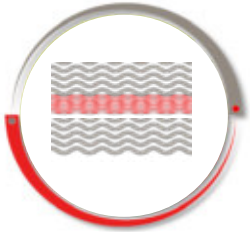
Low Power Wide Area wireless network technology is specifically for connecting devices with low bandwidth requirements, using low power whilst providing increased penetration. Many millions of devices will be connected via LPWA

10+ Years Battery Life



Deep Penetration

Mass Deployment



Low Bandwidth

Device Cost

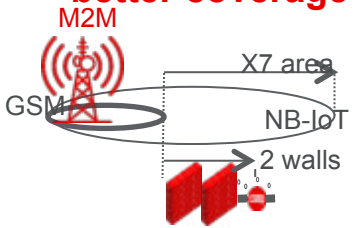
17

What does NB-IoT deliver?

Optimised power consumption

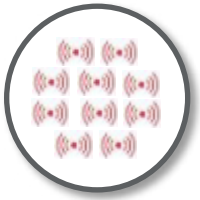
>10 year battery life

High propagation: better coverage



+20dB link budget (vs. GSM)

High end-point density



>100,000 connections per cell

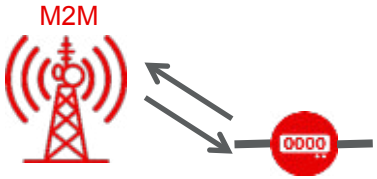
Low complexity devices

Targeting modules costing just a few £

Limited throughput

<200kbps

Bi-directional communication



Uplink and downlink capability

LTE level security

Encryption, SIM based authentication

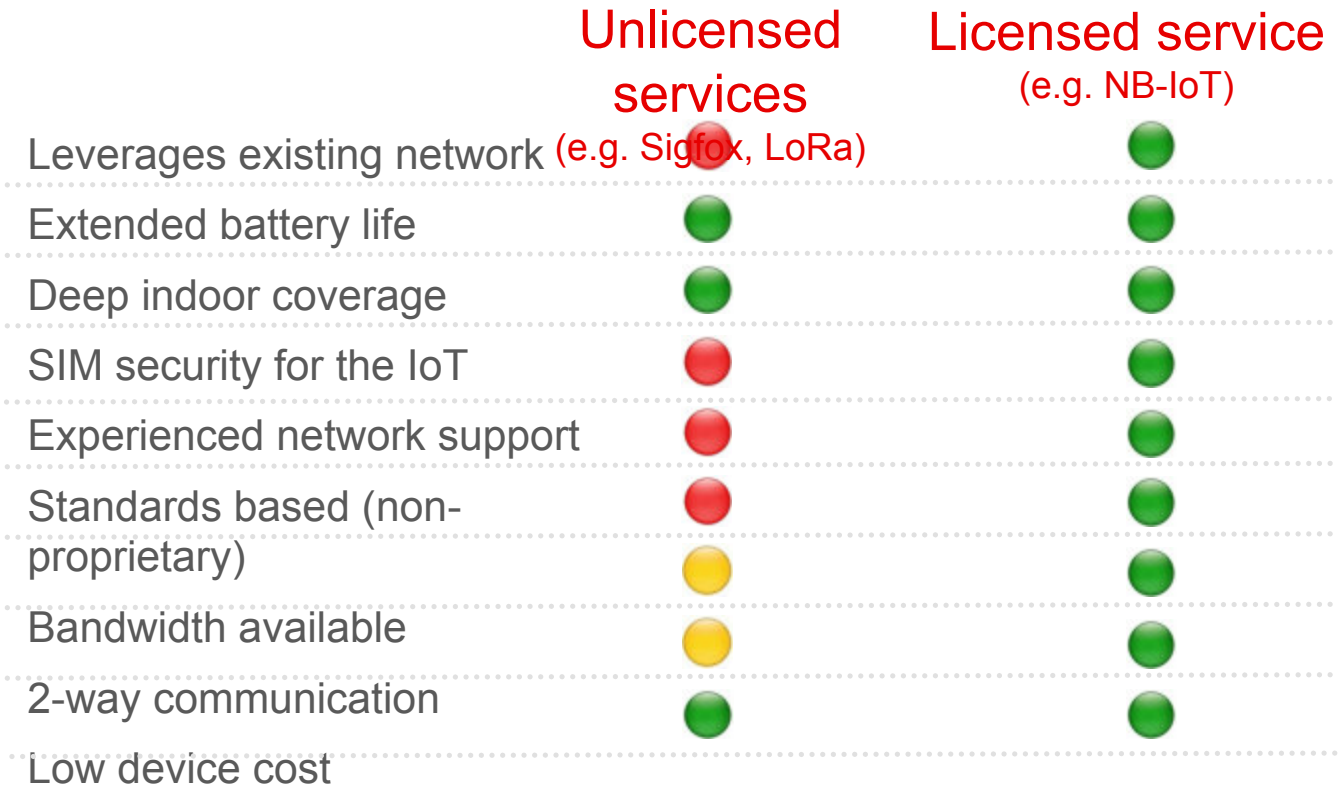
Global standard in licensed spectrum

3GPP
A GLOBAL INITIATIVE

Standardised R13 (June 16)

18

How does it compare to the competition?



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NB-IoT can transform almost every vertical

20

What applications are suited to LPWA?

Gas metering

Large homogenous market measured in millions

Battery life and propogation is critical

Large number of potential meter manufacturers

Water metering

Large homogenous market measured in millions

Battery life and propagation is critical

Large number of potential meter manufacturers

Liquid and pressurised fuel

Large homogenous market measured in millions

Asset is currently un-monitored & losses are high

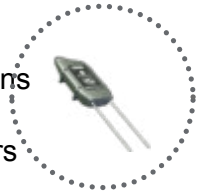
Battery life is critical

Smart Bins

Growing market with good business case

Battery life and network coverage is critical

Complements our high end connected bins

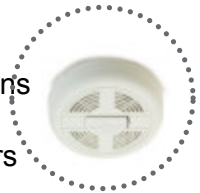


Environmental Monitoring

Latent market waiting for a low power solution

Battery life and network coverage is critical

Fragmented channel to market in low volumes



Smoke and fire alarms

Massive market measured in hundreds of millions

Battery life and ability to test device is critical

High volume B2C play

Parking monitoring

Market measured in hundreds of thousands

Battery life and low install cost are critical

Low data throughput

Alarms and event detectors

Market measured in hundreds of thousands

Battery life is ultra critical

Very low data throughput on check and trigger

1st February 2017 | Opening of NB-IoT Open Lab in Düsseldorf

VODAFONE DEUTSCHLAND

Auf der digitalen Überholspur

Datum: 02.02.2017 12:08 Uhr

Hannes Ametsreiter will Vodafone zum „Motor für das digitale Deutschland" machen. Schnelle Internetanschlüsse über Kabel treiben das Geschäft des Telekom-Rivalen an.

Handelsblatt

Schmalband per LTE: Vodafone lässt die Zukunft testen

Saubere Bahnhöfe per LTE - das könnte möglich werden. Hintergrund ist der unsexy klingende Begriff Narrowband-IoT, ein Standard, der den Alltag verändern könnte.

teltarif.de

ENTWICKLUNGSZENTRUM

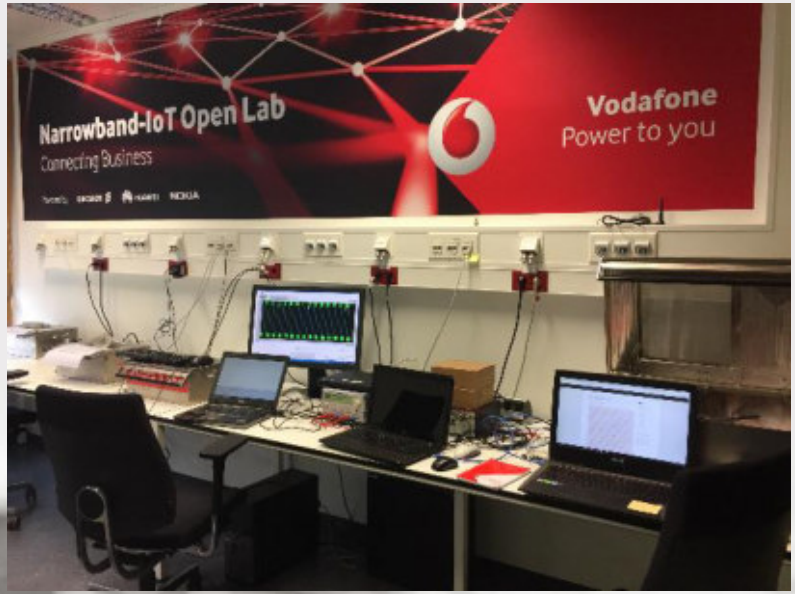
Vodafone startet Testnetz für Narrowband-IoT

Ein erstes Testnetz für Narrowband-IoT von Vodafone Deutschland ist in Betrieb. Es basiert auf vorhandenen LTE-800-Frequenzen und hat auch etwas mit Müll zu tun.

golem.de

Narrowband-IoT Lab | Environment

Working Places



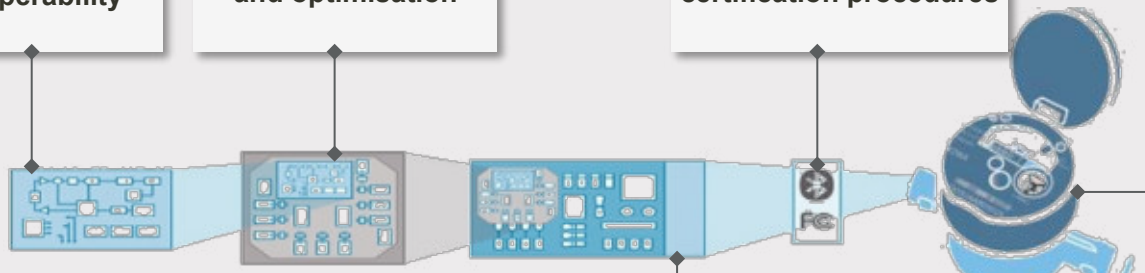
Infrastructure

NB-IoT Open Lab | Test Possibilities for your products

Radio-Chipset Interoperability

Module integration and optimisation

Establish testing and certification procedures



Application and Toolkits development

Chipset | Communication

Module | Communication

Hardware

Certification

Application | Product

Device verification and optimisation

NB-IoT Open Lab | At a glance

Realistic end-to-end Environment with three network vendors

Optimised for NB-IoT Feature verification

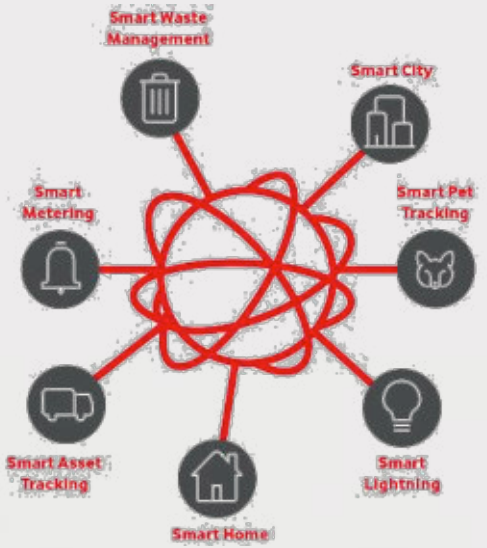
3GPP standardised Network Infrastructure

Connectivity to customer NB-IoT Application Server

Support of Vodafone IoT-experts and vendor experts, who are on site

Trusted solution

ERICSSON HUAWEI NOKIA



Vodafone builds greatest and latest Communication Technologies at the highway A9

- Live network enhancements (LTE800, LTE1800, LET2600)
- Building dedicated test networks, using LTE 2600 TDD spectrum
- Enabling LTE-broadcast, Mobile Edge Computing, Direct mode communication, Crowd RAN, Candidate 5G enabler, etc.
- Access to technologies from multiple vendors

VODAFONE GLOBAL ENTERPRISE

A Global Partner
Active in >150 countries
Wire
Wireless
Cloud
1400
Multi national businesses serviced
1 contract 1 global P&L

Spring – one of Vodafone's largest corporate investment programs

Investing

£19 billion over two years

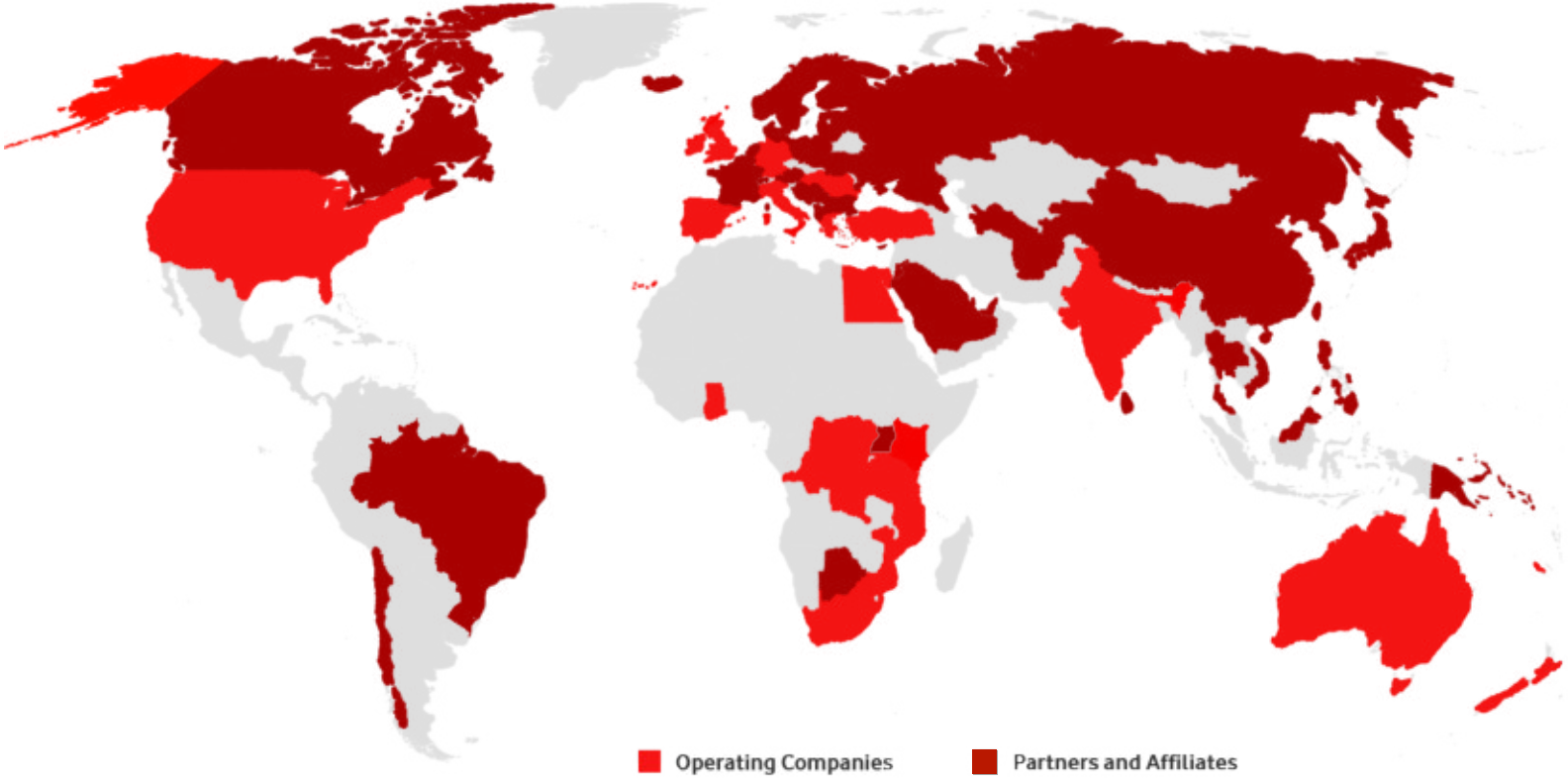
Growing

300+ POPs in 92 countries

Extending

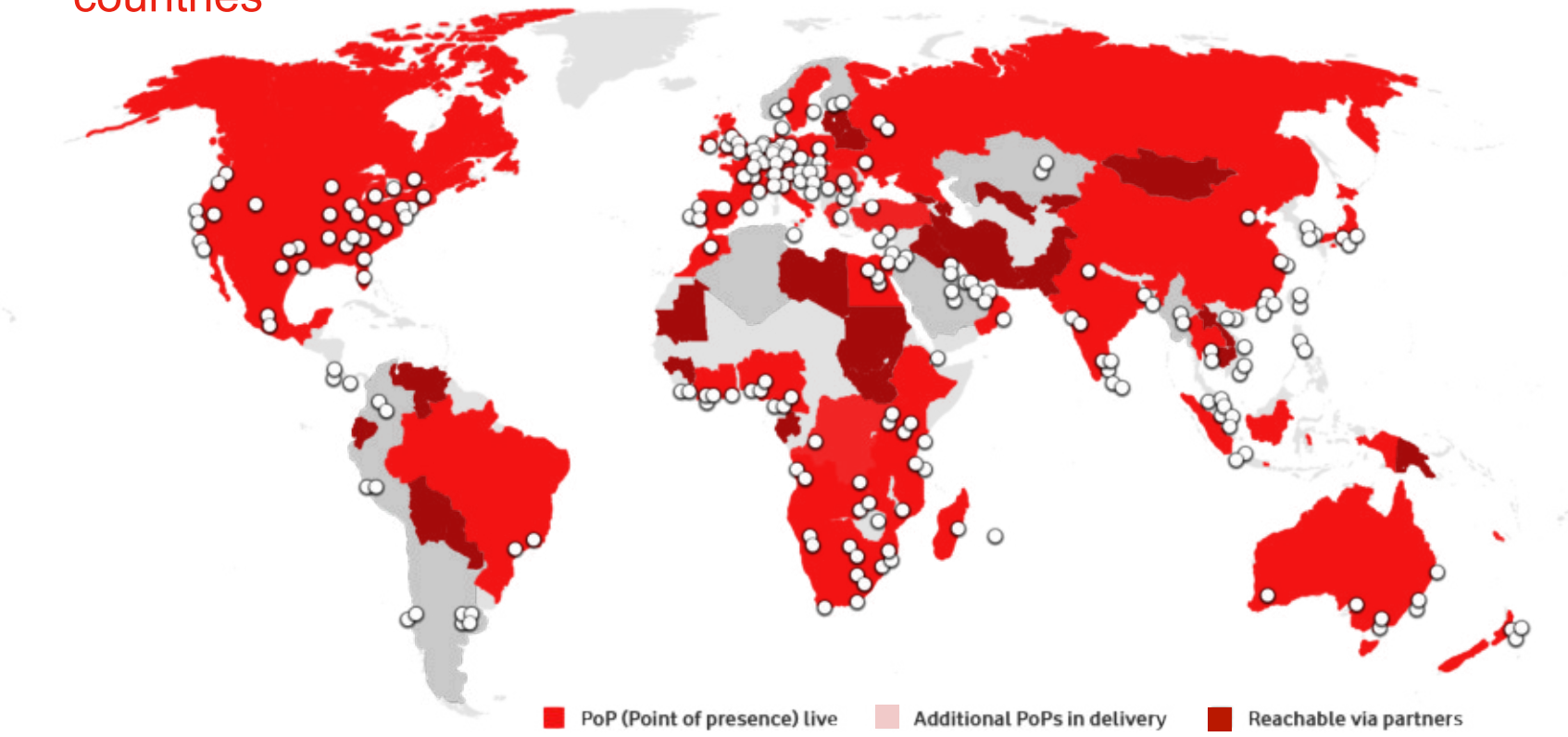
Americas, Asia, Middle East & Africa

Extensive global reach with 26 Operating Companies and a further 55 Partners and Affiliates



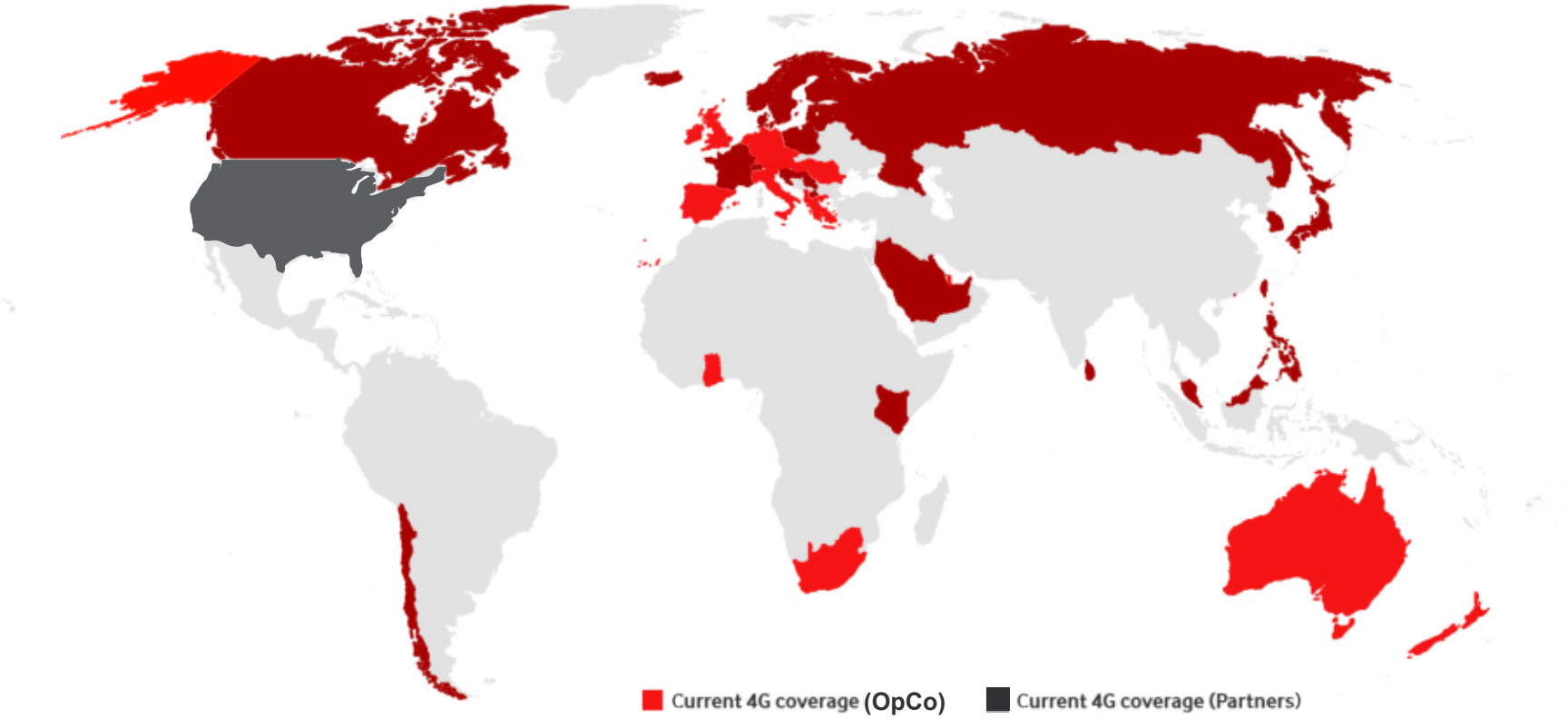
Infrastructure is critical for digital transformation

We have one of the most extensive global networks, covering more than 150 countries



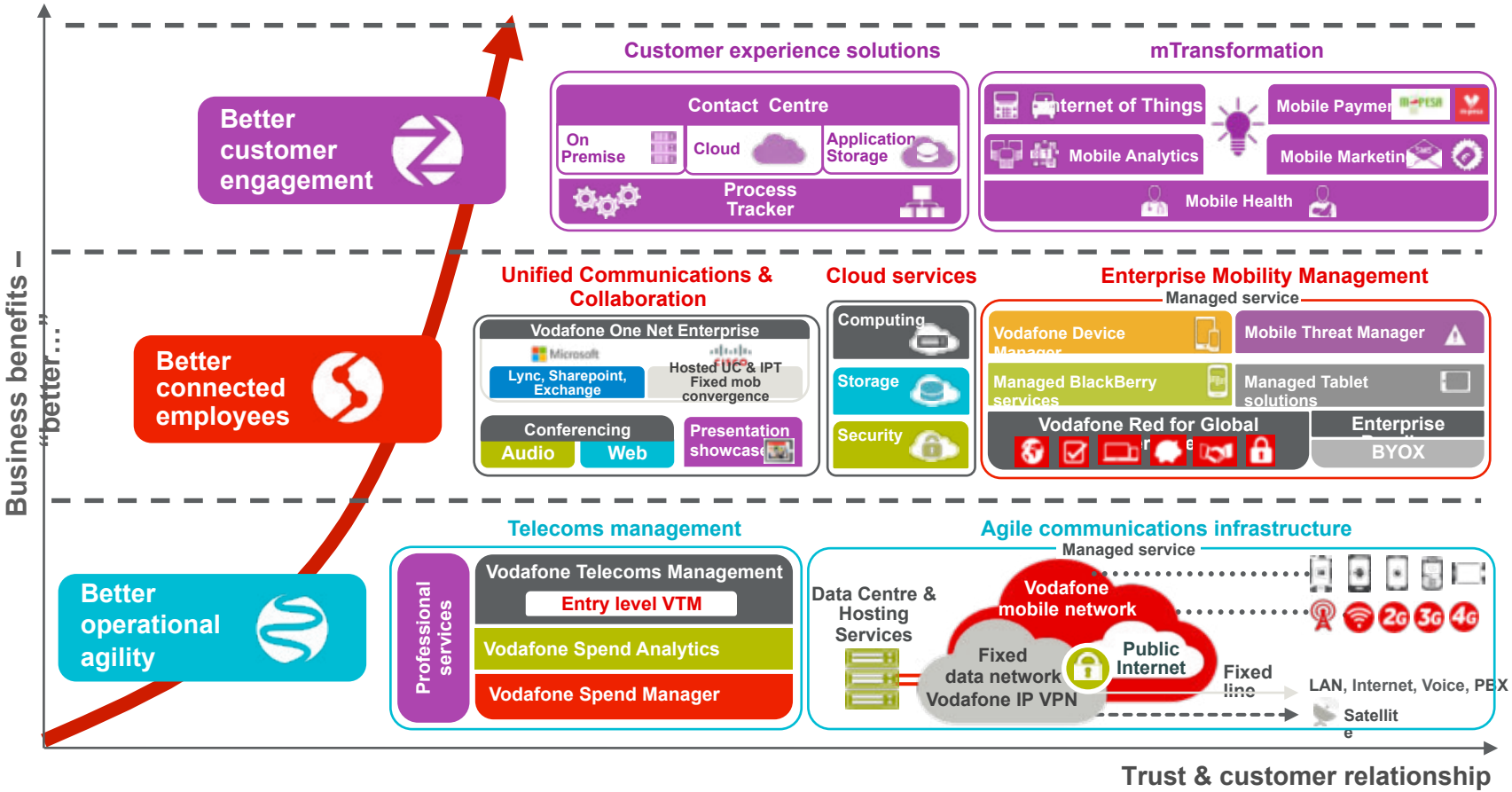
We continue to expand & enhance our mobile networks

445 million customers worldwide with 20 million already 4G enabled



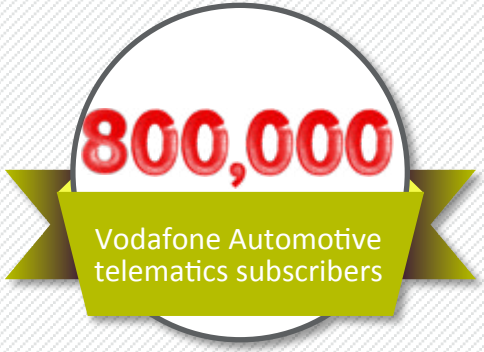
Global data centre presence extended through partners

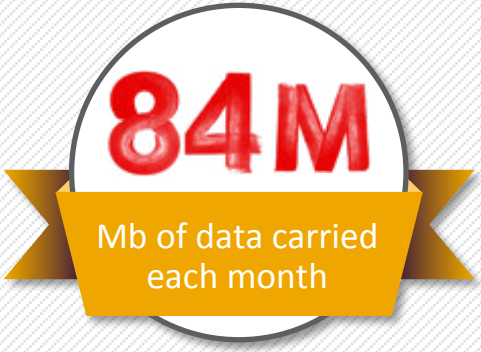
Vodafone Global Enterprise – Our Solutions Portfolio



Vodafone Global IoT

Vodafone Global IoT





* As of Feb 2017

Rated as the best by independent analyst reports

Machina Research

Gartner

GLOBAL IoT NETWORK & 4G

Furthest reaching global presence with local depth

4G coverage
on multiple networks

4G coverage
on a single network

2G/3G coverage
Operative in 182 countries

- Largest fully owned network in more than 30 countries
- Over 700 Roaming Agreements
- Coverage in 182 countries
- 4G in 60 countries
- Compelling competitive commercial contracts
- The ability to control quality of network service for you and our customers
- Commitment to bespoke service level agreements (SLAs)
- Data protection compliance in line with local privacy laws
- Ability to plan investments accurately and predict costs

The Vodafone IoT Portfolio offers different solutions for 5 elementary company departments

Vodafone IoT Solutions

1 Machines

- Monitoring of Machines and Assets (forklifts, tracking of modules, etc.)
- Localization von of goods and machines
- Enabling scanner for data transfer

2 Fleet

- GPS-positioning of Company fleet cars
- Vehicles with digital odometer

3 Facilities

- Energy-Data-Management
- Building / heating control

4 Employees

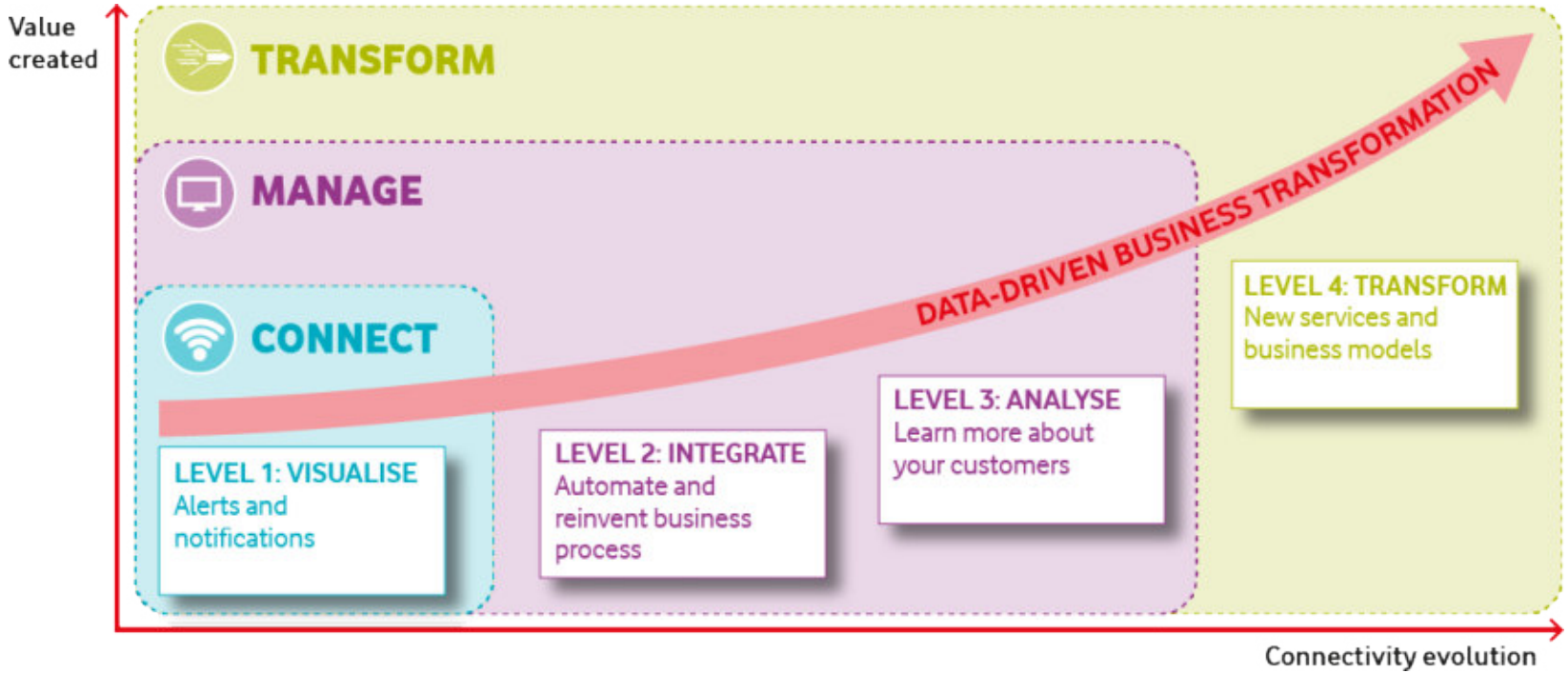
- Employee protection
- Replacement of classic radio network

5 Infrastructure

- Street lightening
- Waste-Management

We help our customers transform their business

A methodology for data-driven business transformation



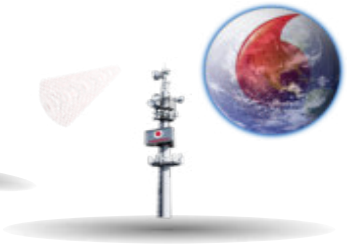
Vodafone's M2M end-to-end solution

Customer Asset

M2M Hardware Portfolio

Vodafone SIM

Global M2M Network



M2M Platform

Application

Vodafone delivers the complete M2M solution (end-2-end)

- One Network
- Global SIM
- SLAs
- Partner
- M2M Platform
- Strong Brand

Contact us:

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