



Company Presentation

Jan 2023

EXPERTS IN **RADIO ACCESS** AND **MOBILE DATA**

Mission Statement

Maximise network performance
and customer experience

Services & Products
to measure, monitor, analyse and
optimise your network & services

EXPERTS IN **RADIO ACCESS** AND **MOBILE DATA**

Commsquare

Your trusted technology partner

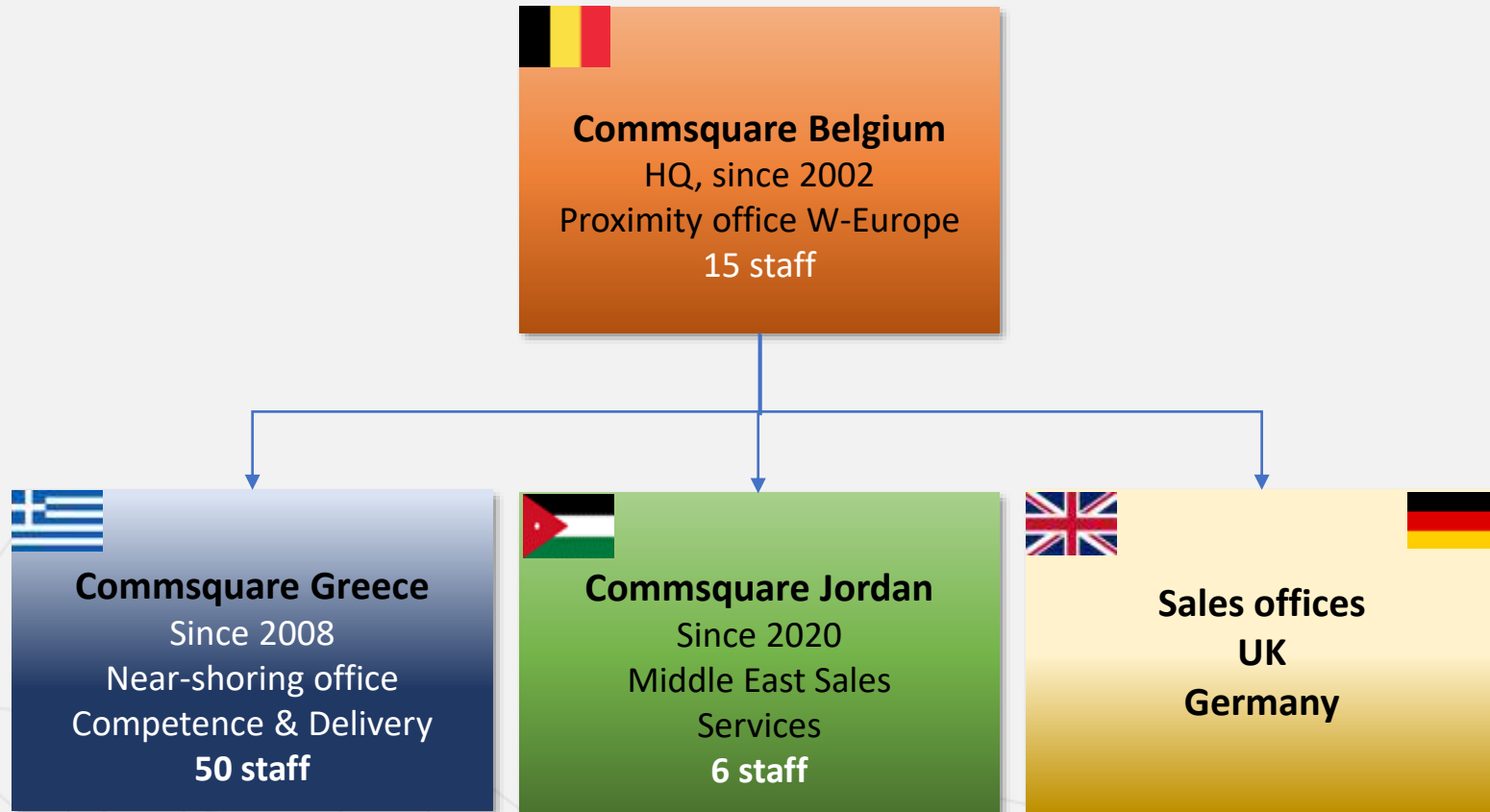
Delivering high quality

Based on deep technology expertise

- Impartial technical advice
- Integrity and transparency
- Easy-to-do business with

Company

3



- Commsquare incorporated in 2001
 - HQ and proximity office for Benelux in Belgium
 - Delivery teams and technology expertise in Greece
 - Project team in Jordan
 - Sales offices in the UK and Germany

History

4

2001
Incorporation
Commsquare
BVBA, **Belgium**

2007
Turnover
> 2 Mio€

2008
Opening of
Commsquare
Hellas, **Greece**

2010
Turnover
> 3 Mio€

2016 (Dec)
M&A
Commsquare joins
Systemics Poland

2016
Turnover
> 5 Mio€

2019 (May)
Founders buy
back
Commsquare

2019
German
Sales office

2020
Jordan Sales
& team

2005
Network
Doctor

2009
Mobile network
Benchmarking

2011
End-to-end
mobile Data
Audit

2019
1st Near-
shoring
services


2019
1st 5G
Project

2020
Partner


2021
DataMon &
DAP 5G

2021
1st Analytics
projects
Internal,
Cosmote & R&S

2022
1st SW Dev
Services
PCCW

2022
1st Group
Benchmark
- DSBO

2022
Near-shoring
Health Files

2008
1st customer



2010
1st customers

Portfolio

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Services

Managed Services

KPN NL Health Files

Radio Engineering, Planning and Optimisation

Expert Services

Consultancy
"Network doctor"

Technology validation
End-to-end Audits
Training

Benchmarking

Drive & walk tests
Deep dive analysis

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Product

Analytics

Internal
(BART, DAP,
DataMon)

AI/ML
Root cause
analysis
Expert system,
Automation

External
Contract
development

Anomaly detection,
BART:
Benchmarking
Analytics &
Reporting Tool

Products

DataMon

Passive
monitoring

SW dev
services

DAP

Active
testing

Expert Services

- **Benchmarking & Drive Testing**
 - Drive tests & train measurements
- **Consultancy**
 - Validation, reporting, deep-dive investigations
 - Technology validation, network doctor
 - Performance improvement projects
 - Expert, hands-on training



Freerider Phone Unit



Measurement Car with VRB (ski-box)



Measurement Car with PMW

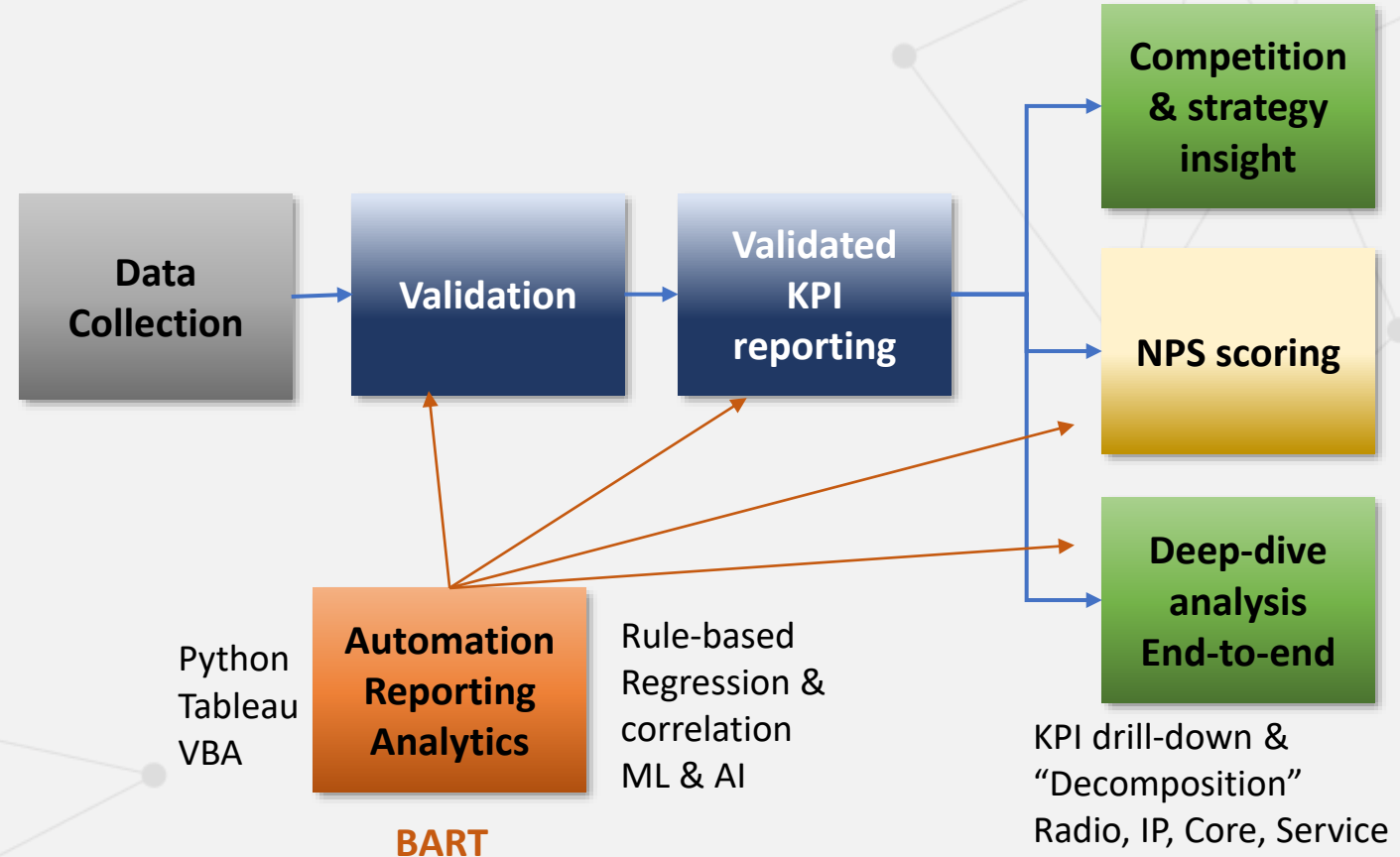
Benchmarking & Drive Testing

Mobile Network Benchmarks

- Since 2010, drive, walk & train tests
- For network operators & telecom regulators
- Rohde & Schwarz equipment
 - R&S certified partner
- Deliverables
 - Validated KPI reporting
 - Deep-dive analysis & recommendations
 - BART (Benchmarking Analytics & Reporting Tool):
Web tool for result sharing & further investigations

Drive Testing

- Before/after measurements
- Network modernization & vendor swap validation
- Cluster optimization



Consultancy

Network & service optimisation

- Focus on mobile networks (MNOs)
- Also projects for ISPs (i.e. with an IP focus)

Best technical expertise in the market

- Expertise across technology silos (radio, core, IP)
- Key differentiator: holistic, end-to-end view

In-house tool BART

- Benchmarking Analytics Reporting Tool
- Embed expertise in a tool
 - A tool allows to scale, preserve quality & automate delivery

Mobile network benchmarking

- Measurements & analysis based on drive tests
- Including deep-dive root-cause analysis
- For mobile operators & regulatory authorities
- Recurrent, e.g., 2x/year per customer, or long-term

Network doctor & technology validation

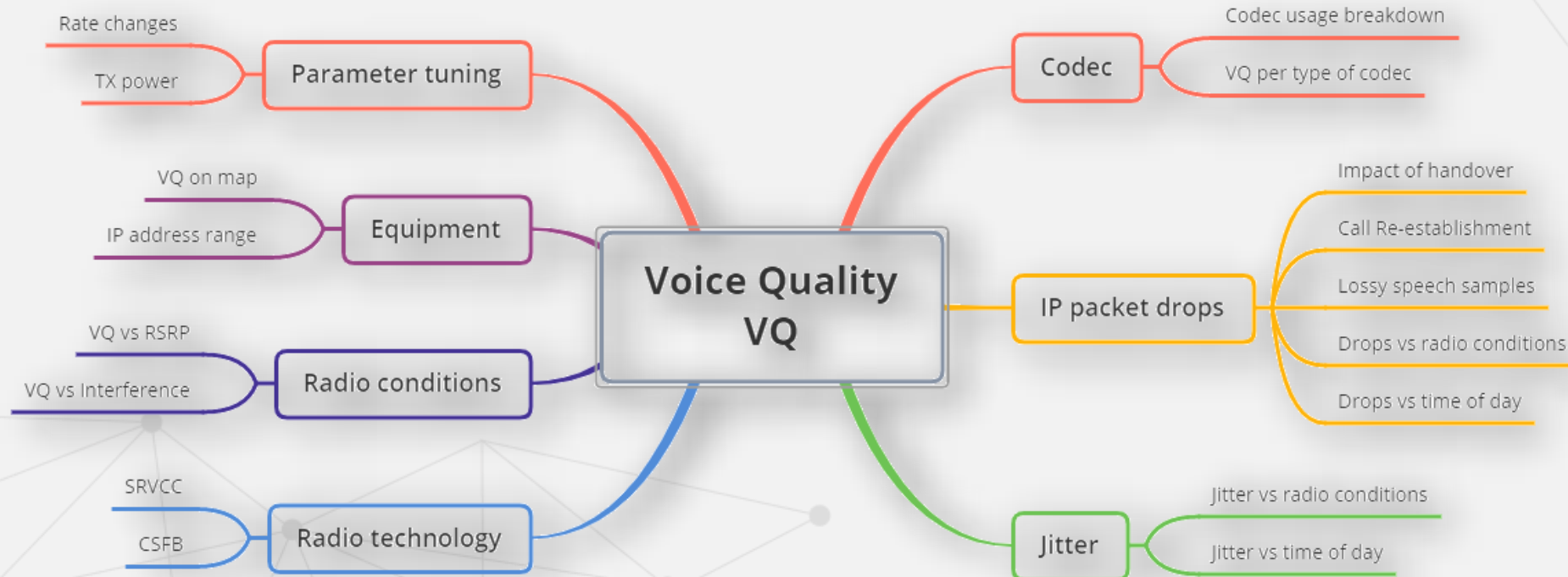
- Get maximum performance from the network
- Solve “hard” technical issues
- E.g., 5G launch; low throughput; new RAN optimisation
- Ad-hoc projects, requiring high expertise

Near-shoring teams

- Replace operator staff with remote Commsquare team
- Cost-effective & scalable outsourcing, bring expertise
- Long-term contracts

Deep-dive: e2e KPI drill-down

- “Decompose” top-level KPI in contributors
- Radio, core, IP, end-to-end branches: Further drill-down into underlying algorithms & parameters
- Implemented on drive test data: (BART)



DataMon



Control plane: 2G/3G/4G/5G data & voice

User plane: DPI & traffic classification; TCP metrics & application KPIs

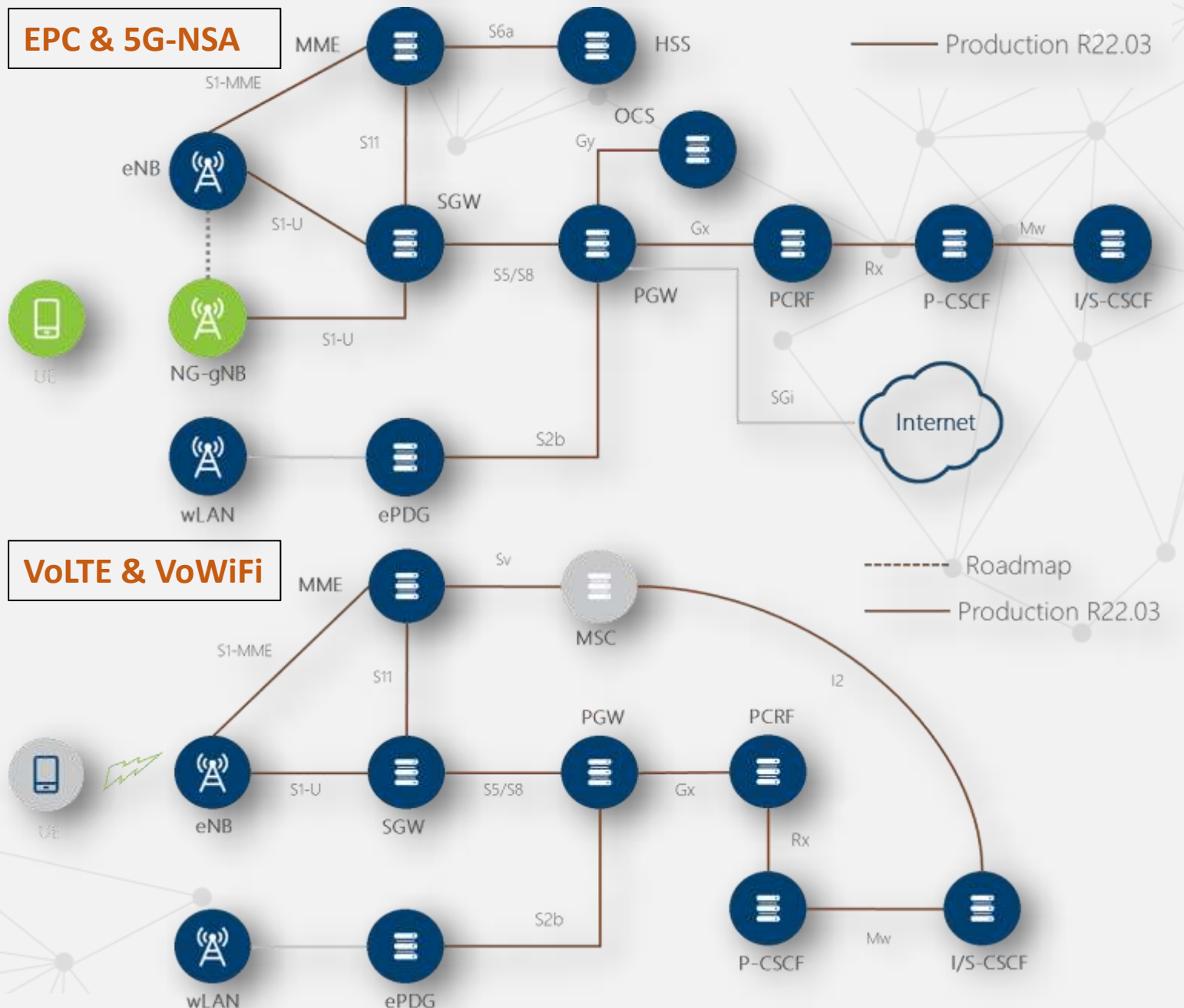
Troubleshooting & Analytics: Real-time & history; IP filtering

Open system: Open APIs south-/north-bound

High speed capture to disk: 40Gbps line rate

Cloud-native: Micro-services, DevOps

Low HW footprint



DAP - Active Testing



Unattended, real-time active testing and monitoring

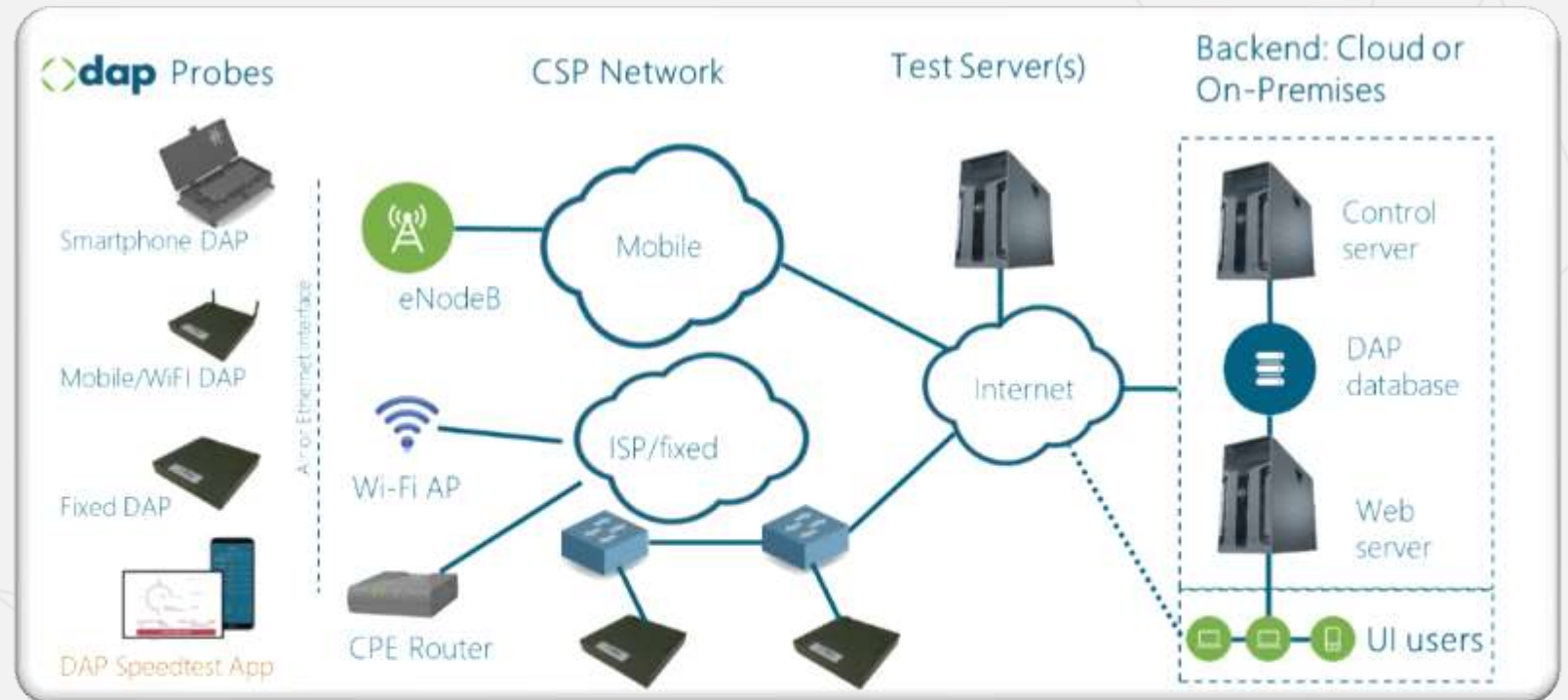
- Test probes and/or DAP Speedtest App
- Central backend server; in the cloud
- Web UI for reporting & management

Performs controlled tests

- Over Mobile, Wi-Fi & Fixed
- Data and voice
- 24/7
- Emulates the end-user

Helps CSPs assess

- Network performance
- e2e Subscriber experience



- Domain expertise in mobile telecom
- Machine learning & big data concepts
- Product development SW & IT

Services

Mobile Telecom Domain Expertise

MACHINE LEARNING



Products

SW
development &
IT skills



Technology Focus

5G

- Innovation for the 5G ecosystem
- Support in all services & products



Product:

- SW-only solutions
- Open APIs
- Open on input/output south-/northbound

Analytics

- Get more value from the data we have, but also from non-Commsquare data sources
- Embed our technology expertise in services & tools
- Create insights beyond technology expertise

End-to-end network & service optimisation

- IP, network traces, Crowdsourcing data
- Deep-dive Beyond drive test data

Near-shoring

- Grow existing teams
- Attract more customers from new markets

Technology & market exploration in 2021

- Private Networks
- Open networks, Open RAN
- Convergence to IP networks and IMS voice

Key differentiators



We understand how mobile networks work

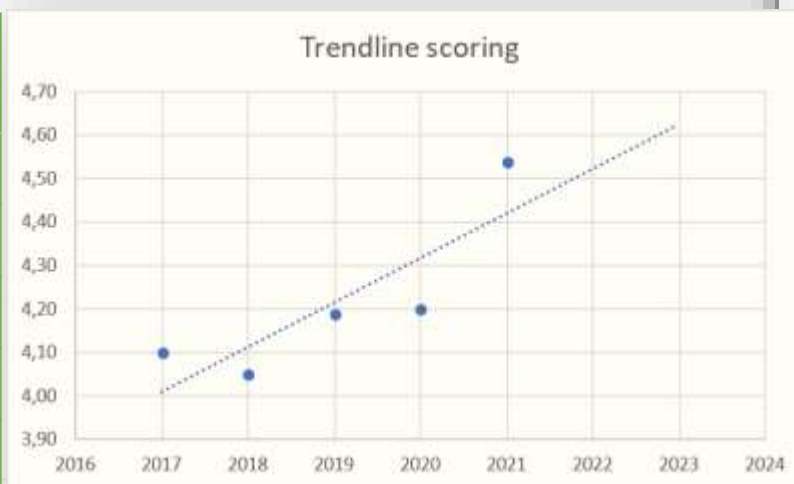
- Benefit from the technical expertise of our Services
- Get more value from data through our Analytics team
- This expertise is embedded in our Products *"Built by engineers for engineers"*

High Quality: Customer scoring

Quality is a Commsquare differentiator:

- A scoring above 4 received in the past 5 fiscal years
- Highest score ever in the current fiscal year

Fiscal year	Overall satisfaction score (weighted)
2017	4,10
2018	4,05
2019	4,19
2020	4,20
2021	4,54



Questions

Responses

Legend

1 = failure
 2 = fair, below expectations
 3 = good, meeting expectations
 4 = very good, above expectations
 5 = excellent, exceptional

3. What is your overall satisfaction with the project? *

1 2 3 4 5

4. How do you rate the quality of the deliverables? *

1 2 3 4 5

5. Did the Commsquare team deliver the agreed deliverables? *

1 2 3 4 5

6. Did the project meet the agreed timing and important deadlines? *

1 2 3 4 5

Partnerships & Memberships

- Certified Rohde & Schwarz SwissQual partner for Mobile Network Testing, services and products



- ETSI STQM member



Major references

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proximus



kpn



telenet



vodafone

T-Mobile



swisscom



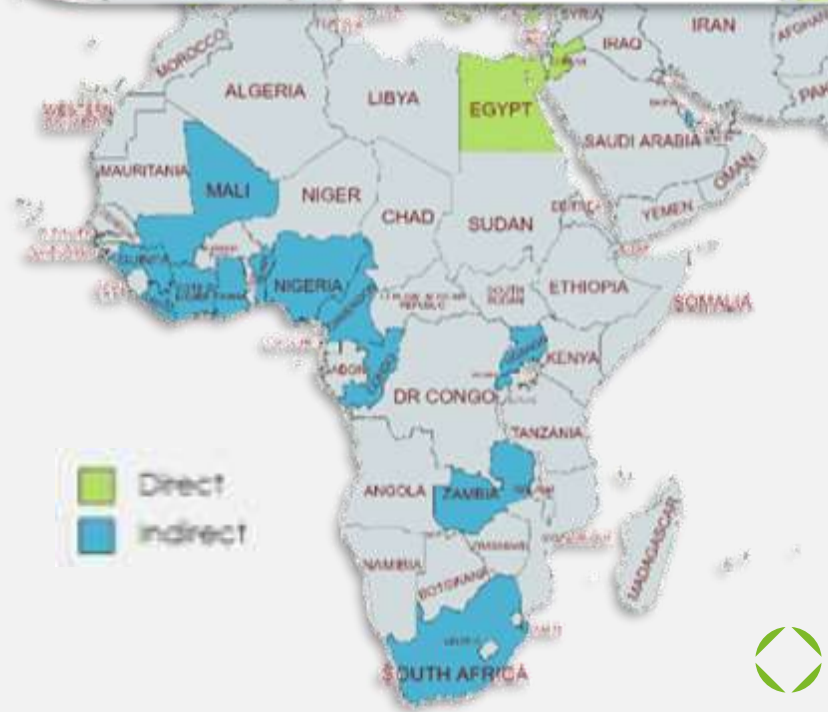
COSMOTE

SwissQual
A Rohde & Schwarz Company

bipt



cyta



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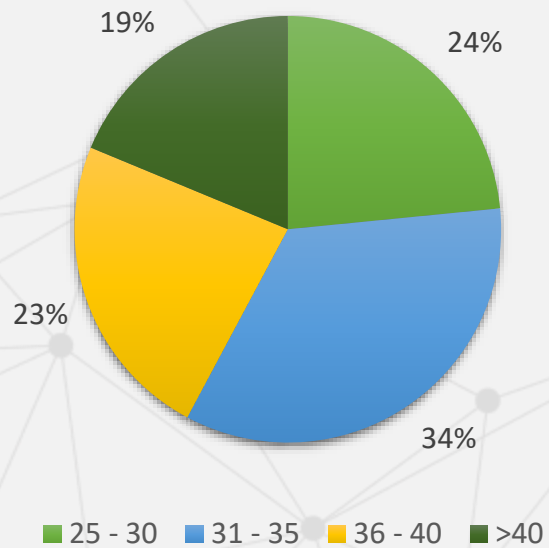
Team Demographics

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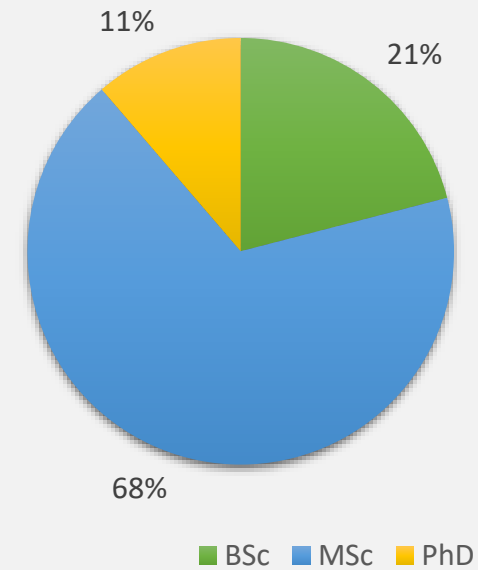
February 2022

People working for
Commsquare

Age Distribution



Education



Careers at Commsquare

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Required Electrical Engineer profiles

- Telecommunication engineers
- SW development engineers
- Data Science engineers.

Working at Commsquare you can become member of a team with:

- high specialisation and deep expertise in Telecommunication Technologies
- Belief in excellence
- Appropriate structure and organisation to absorb new members and bring them up-to-speed
- Apart from valuable knowledge in a cutting-edge technology sector, like telecoms, Commsquare engineers also acquire important experience working in a demanding environment, with exposure to international markets and customers from various countries and companies



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Thank you