

HOW TELECOMS CAN MAXIMIZE THEIR COMPETITIVE EDGE USING 5G DATA

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SQREAM



5G UNDERLYING USE CASES

Enhanced Mobile Broadband

supercharges connectivity, extremely fast network speeds and greater capacity

Massive Machine Type Communications

allows for one million connected smart devices and sensors per square km



Ultra-reliable and Low Latency Communications drastically improves the speed of communication for things like autonomous vehicles

WIRELESS INFRASTRUCTURE REVENUE FORECAST

Segment	2018	2019	2020	2021
5G	612.9	2,211.4	4,176.0	6,805.6
2G	1,503.1	697.5	406.5	285.2
3G	5,578.4	3,694.0	2,464.3	1,558.0
LTE and 4G	20,454.7	19,322.4	18,278.2	16,352.7
Small Cells	4,785.6	5,378.4	5,858.1	6,473.1
Mobile Core	4,599.0	4,621.0	4,787.3	5,009.5
Total	37,533.6	35,924.7	35,970.5	36,484.1

Due to rounding, figures may not add up precisely to the totals shown.

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6 Things to Know about 5G

1 A G-Whiz Technology

5G stands for **fifth generation wireless** technology. It follows 1-4G, but 5G comes with a twist. 1G and 2G were based on delivering voice service; 3G brought us mobile data; and 4G the mobile internet; yet **5G will fundamentally transform the role that mobile technology plays in society.**



1G & 2G
delivering voice service



3G
mobile data



4G
mobile internet



transforming mobile technology in society



4 Greater Efficiency

Not only is 5G faster and nearly lag-free, but it is also more efficient. **5G will consume less power on devices**, meaning longer battery life. 5G's greater network capacity also means that **the network will be able to handle the rapid growth of connected devices** driven by the demand of the Internet of Things.³

5G Efficiencies



Longer Battery Life



Growth Capacity

2 5G Is Freaky Fast

5G will **increase download speeds** up to 20 Gb per second compared to 4G's one Gb per second. That means **a full HD movie can be downloaded in a matter of seconds** versus an hour to download a HD movie in 4G.¹



1 Gb per sec



20 Gb per sec

5 Transformational Technology

Today, **mobile telecom technology isn't classified as a "general purpose technology."** GPTs like electricity, the internet, and the internal combustion engine drastically transformed both daily life and the ways business is conducted. 5G can potentially launch mobile communications into that exclusive realm, as it paves the way for massive innovation and gives rise to new industries that benefit entire economies. **5G will ultimately advance mobile from a set of technologies connecting people to people and information to a unified fabric connecting people and machines to just about everything.**⁴



3 More than Speed, Reliability

5G networks promise low lag time – preventing that annoying jitter and other experience-robbing issues known as latency. Under 5G, users should see a maximum latency of just 4 milliseconds, down from about 20 milliseconds on LTE cells. The 5G spec also calls for a latency of just 1 millisecond for ultra-reliable, low-latency communications.²



Higher Speeds



Lower Latency

6 The Big Economic Bang

5G will unleash unprecedented economic growth. The 5G value chain alone could generate nearly **\$3.5 trillion in revenue and support 22 million jobs by 2035.** Over time, **5G will boost real global GDP growth by \$3 trillion cumulatively from 2020 to 2035**, roughly the equivalent of adding an economy the size of India's to the world in today's dollars.⁵

5G Value Chain Potential



\$3.5 Tril
in Revenue



22 Mil Jobs
by 2035



GDP up by \$3 Tril
from 2020 - 2035

GLOBAL DATASPHERE TO HIT 175 ZETTABYTES BY 2025

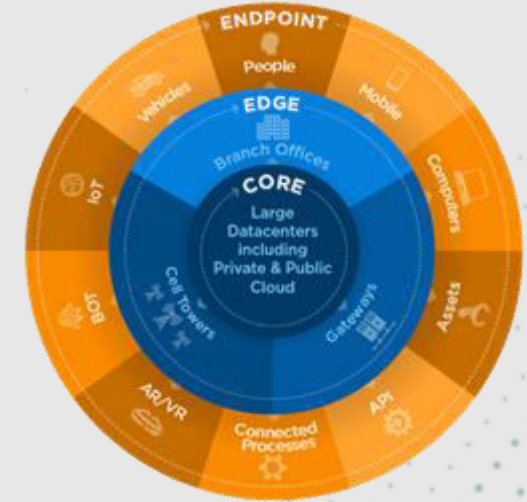
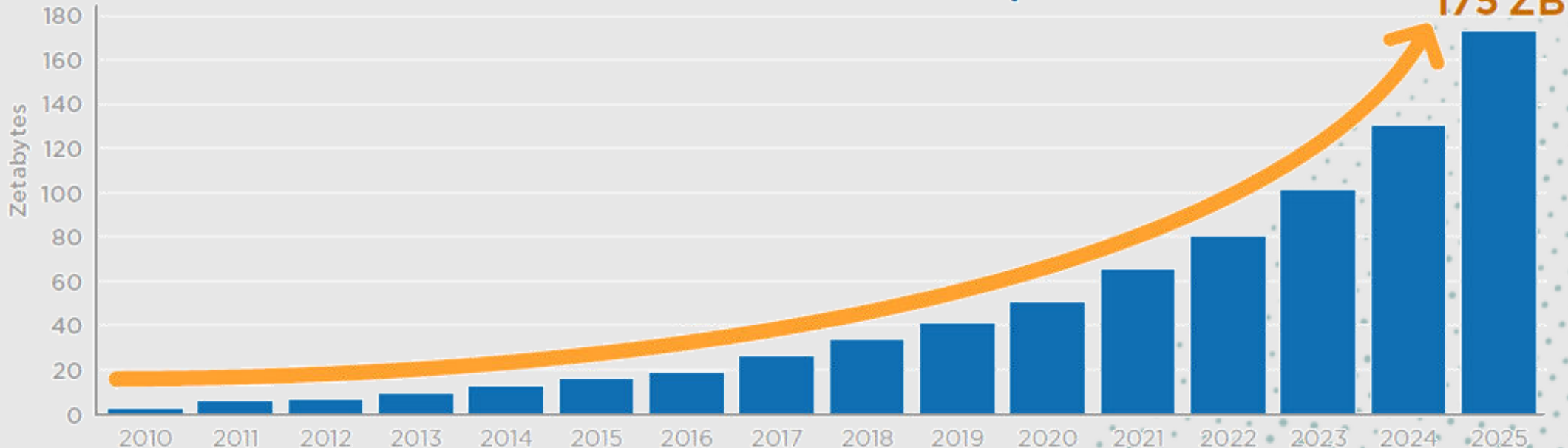
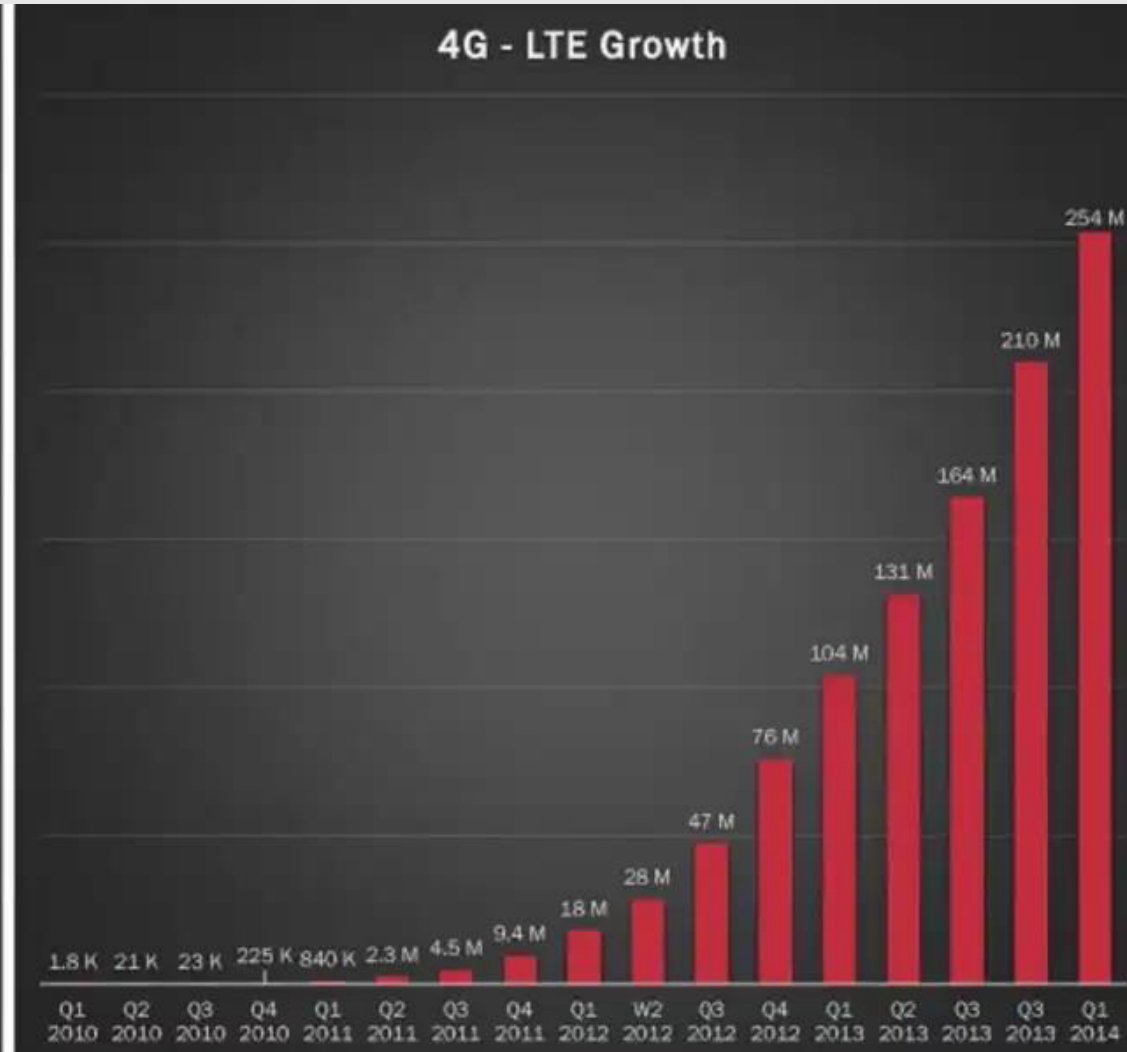
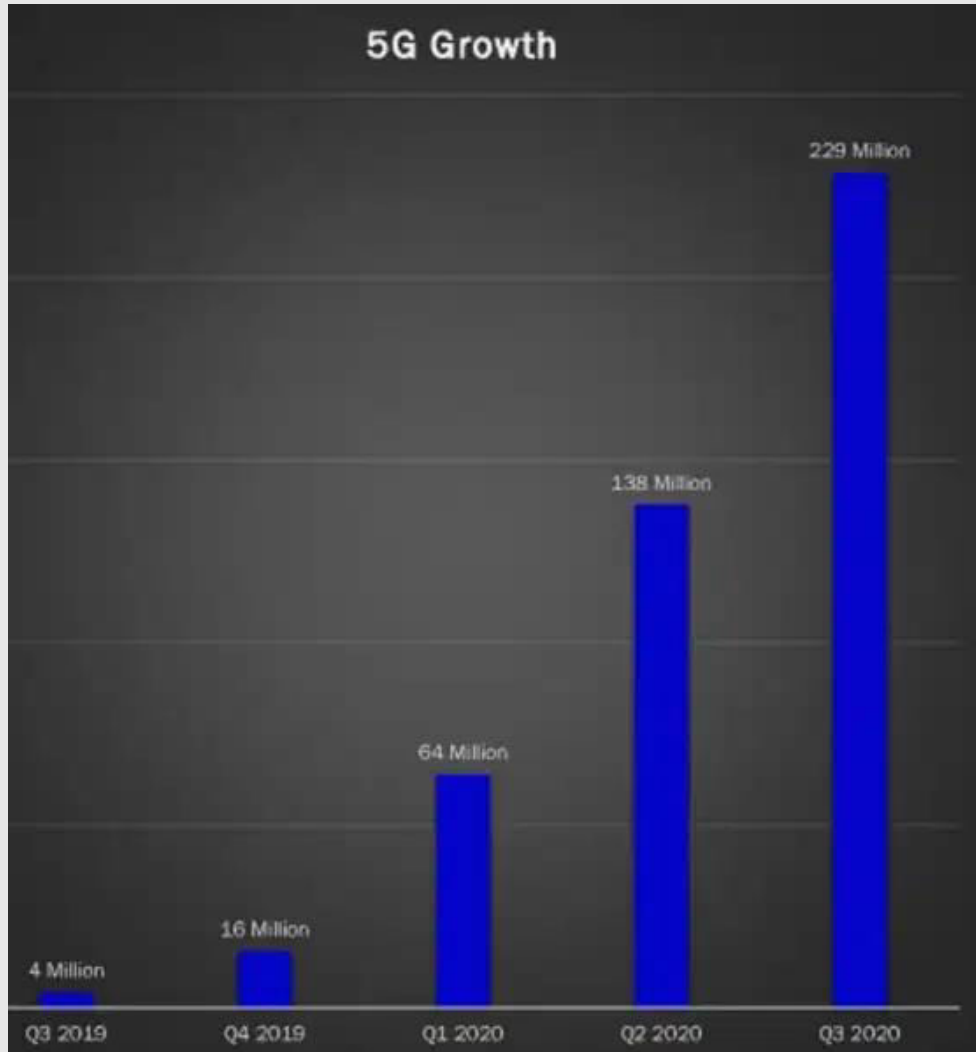


Figure 1 - Annual Size of the Global Datasphere

Annual Size of the Global Datasphere



5G LAPS 4G MILESTONES, SETS STAGE FOR MASSIVE ENTERPRISE DATA GROWTH



ORANGE PREPARES FOR 5G DATA SURGE

MOBILE

WORLD LIVE



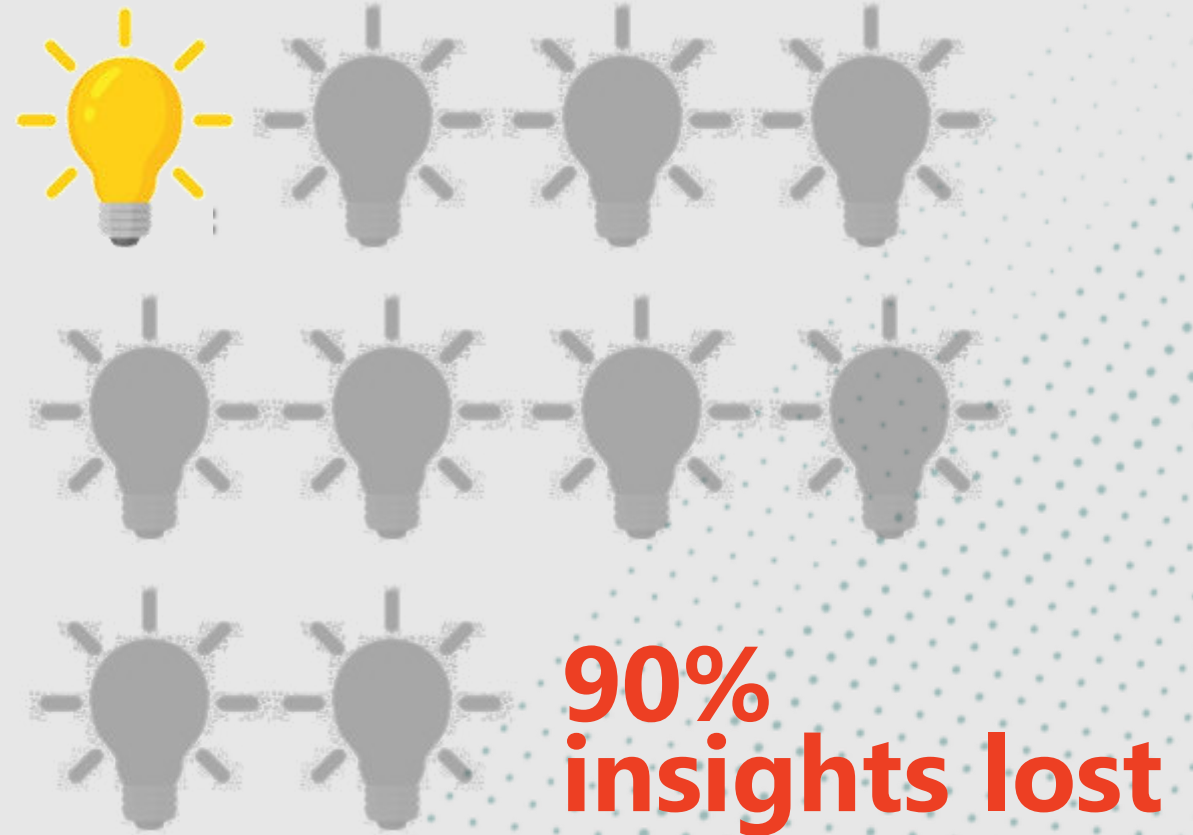
“Data traffic is ***growing at a rate of 40% a year***, meaning the operator must continuously invest in the network to add capacity.”

“***Significant growth of data traffic*** in the consumer and enterprise markets would ***unlock key opportunities*** in a variety of sectors.”

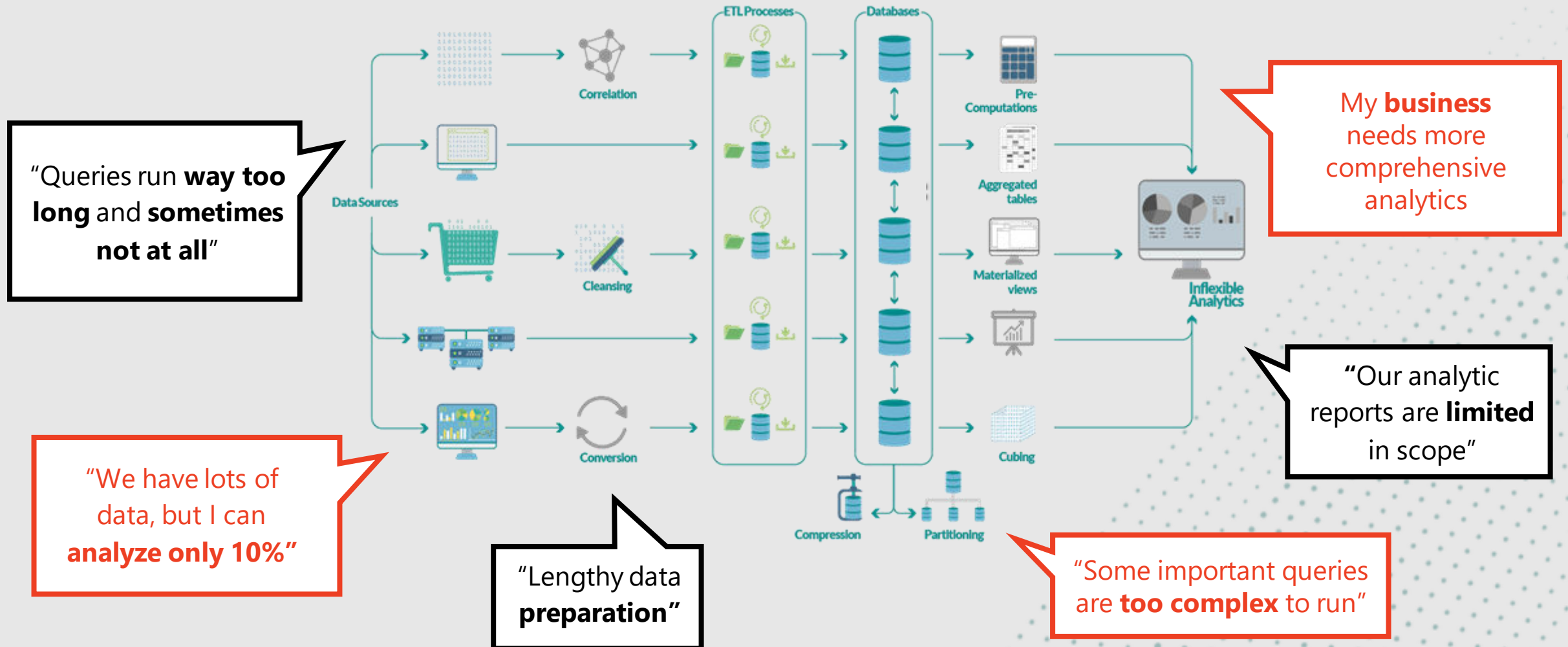
Orange CTIO Michael Trabbia

DATA VOLUMES GROW WHILE INTELLIGENCE SHRINKS

Analytic Data	Data Lake	% of Data Analyzed
10 TB	100 TB	10%
20 TB	500 TB	4%
30 TB	1 PB	3%
50 TB	10 PB	1/2%



WHAT WE HEAR FROM OPERATORS



WHAT SQREAM DELIVERS



Data analytics acceleration platform for **MASSIVE DATA**, driving game changing insights and value



MAKING A MASSIVE DIFFERENCE



NETOPS

- Preempt network issues
- Effectively plan resources
- Reduce OPEX



IMPROVED QOS

- Predict heavy usage
- Relieve congestion
- Reduce dropped calls



CUSTOMER 360

- Tailor customer experience
- Create targeted offerings
- Reduce churn



CYBERSECURITY

- Robust AI/ML training
- Accurate threat detection
- DDoS prevention

CASE STUDY: TELECOM

CAPITALIZES ON CUSTOMER DATA



CHALLENGE

- Existing Hadoop-based architecture couldn't support the scope and complexity of analytics required.
- Aggregated reports did not allow for targeted insights.

SOLUTION

- Increased the amount of customer data analyzed by orders of magnitude.
- Ability to slice and dice raw data to uncover specific customer trends.

- BENEFITS -

- Improved QoS, reduced churn
- Targeted offerings, location-based ads
- Increased revenues and efficiency



CASE STUDY: TELECOM

DEPLOYS SMART NETWORK PLANNING

CHALLENGE

- Tier-1 mobile operator needs to analyze massive network, signal, and geographical data, and antenna parameters.
- Determine where to invest or update the mapping of cell towers and associated equipment.
- Existing solution required constant manual work.

SOLUTION

- 10.5 TB ingested in 50 min. (3 TB/hr/GPU; 4 GPUs)
- 1:8 compression rate.
- Rapidly analyzed millions of records.
- Geographic heat map created of cell towers, showing signal strength and path loss per coordinate, and coverage overlaps.

- BENEFITS -

- Recursive query reduced from 2.5 days to 15 min
- Improved network QoS
- Optimized use of resources, reduced costs



CASE STUDY: TELECOM

GAINS COMPETITIVE EDGE



CHALLENGE

- Billions of CDRs every week
- Difficulty scaling their MPP system
- Extremely slow ad hoc querying

SOLUTION

- Reduced reporting time from 2 hrs to 10 min
- Load time reduced from 6 hrs to 20 min
- 1 GPU server replaced 5 racks of 7600 CPU cores

- BENEFITS -

- Improved netops and first-call resolution rate; reduced churn
- Deeper competitive analysis
- Optimized ad-spend



CASE STUDY: TELECOM

SCALES TO SUPPORT GROWTH



CHALLENGE

- Existing database severely restricted analytics.
- Reports had to be carefully timed
- Significant filters were placed on historical queries to reduce database load.

SOLUTION

- Deep data analysis, facilitating 40,000 queries daily.
- Detailed, high-frequency reporting.
- Drill-down capabilities for deeper analysis
- Rich visual reports

- BENEFITS -

- Improved customer service; reduced churn
- Increased operational efficiency



CASE STUDY: TELECOM

IMPROVES QUALITY OF SERVICE



CHALLENGE

- Network problems frustrated customers.
- Existing solution involved arduous manual analysis.
- Technical issues already escalated by the time they were identified.

SOLUTION

- Integrated with SpotFire, rapidly analyzes massive data from eNodeBs.
- 33B rows scanned in seconds.
- Engineers pinpoint QoS issues before they become problems.

- BENEFITS -

- Dropped calls
Reduced by 90%
- Improved QoS and customer service
- Reduced churn



CASE STUDY: TELECOM

UNCOVER CUSTOMER USABILITY TRENDS

orange™

CHALLENGE

- 30 million subscribers with 4.3 billion call records
- Unable to analyze majority of their data
- Queries must be limited in timeframe in order to complete, limiting insights.

SOLUTION

- Integrated with SpotFire
- Rapid analysis of massive CDR data
- Can cross-reference CDRs with network statistics
- Reduction of 60% capacity

- BENEFITS -

- Uncovered new customer usage trends
- Improved QoS



CASE STUDY: CYBERSECURITY

SECURES VAST NETWORK

CHALLENGE

- Protect vast network of tier-1 mobile operator.
- Distinguish cyber threats from legitimate activity during peak usage times.
- False detection leads to the disruption of customer usage.

SOLUTION

- Integrated with SAS Viya to rapidly ingest and analyze massive data from multiple sources.
- AI algorithms are trained to detect cyber and DDoS attacks.

- BENEFITS -

- High detection accuracy, with minimal false alarms
- Reduced operational costs



BUILT FOR MASSIVE DATA ANALYTICS



POWERED BY GPUs

- Massively parallel engine
- Faster and smaller than CPUs



MASSIVELY SCALABLE

- Terabytes to petabytes
- Not limited by RAM



EXTENSIBLE FOR ML/AI

- Python, AI, Jupyter, etc.
- Built for data science



MINIMAL FOOTPRINT

- High throughput compute
- Very cost-efficient



LIGHTNING FAST

- Ingests 3 TB/hour/GPU
- Always-on compression



SQL DATABASE

- Familiar ANSI SQL
- Standard connectors



RAPID ANALYTICS ON MORE DATA MORE FREQUENTLY

Rapidly analyze the full scope of your massive data, from terabytes to petabytes, to achieve critical insights that were previously unattainable.

**ANALYZE
DATA
FASTER**

RUN SQL
QUERIES FASTER

**ANALYZE
MORE
DATA**

RUN QUERIES
ON MORE DATA

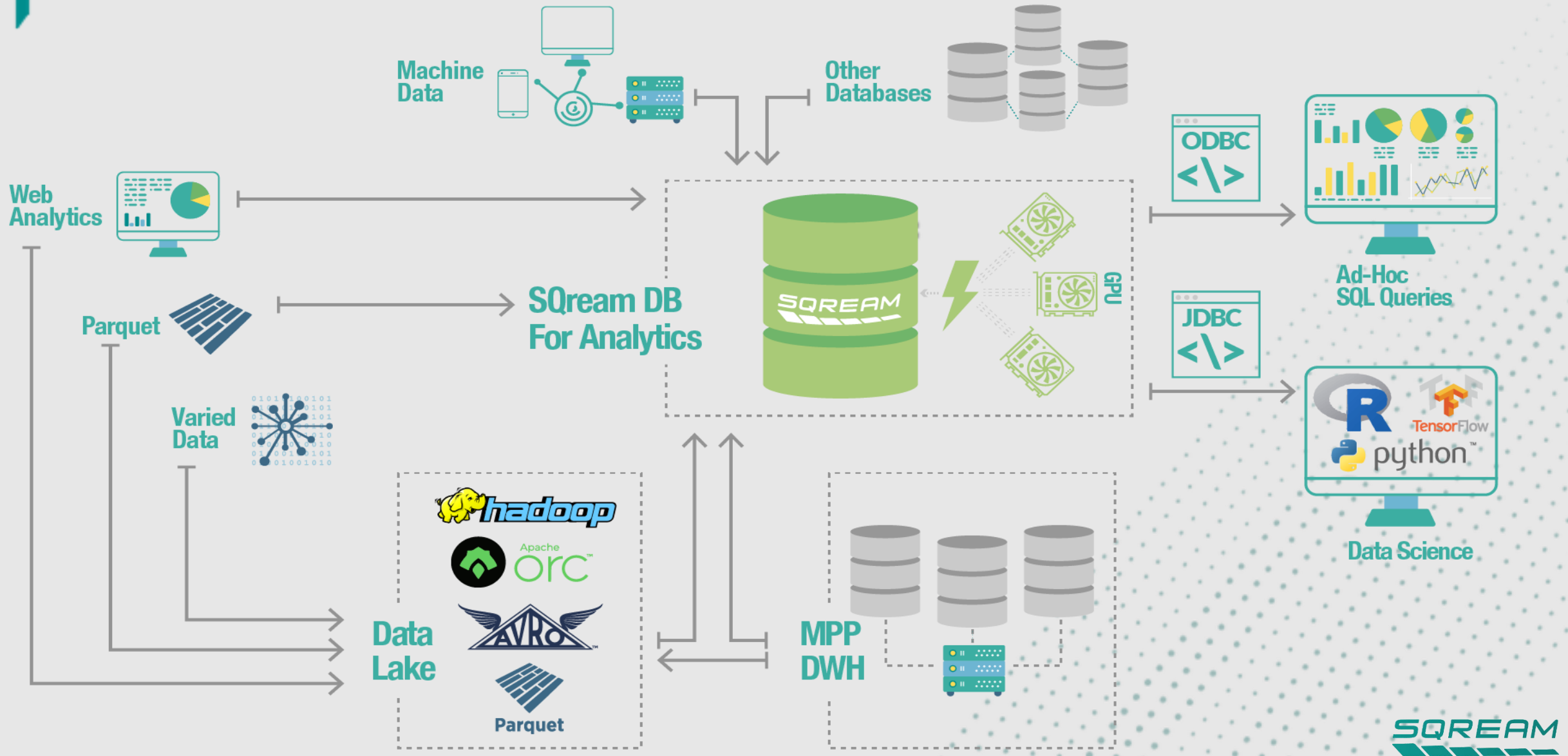
**ANALYZE
MORE
DIMENSIONS**

ENABLE MORE
COMPLEX JOINS

**SHORTEN
DATA
PREPARATION**

AD-HOC QUERIES
ON RAW DATA

ACCELERATE YOUR DATA PIPELINE



ARCHITECTED FOR MASSIVE DATA

SELECTING SQL ENGINES FOR MODERN DATA WORKLOADS

SQream is architected for *massive data stores* and adds enhancements to the data warehousing life cycle and speeds up data ingestion - 8 January 2020

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WE ARE SOCIAL

A dark, teal-tinted photograph of a dense city skyline, likely New York City, with several skyscrapers visible.

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