Whitepaper

# Analytics
## on the edge

## The rise of edge computing

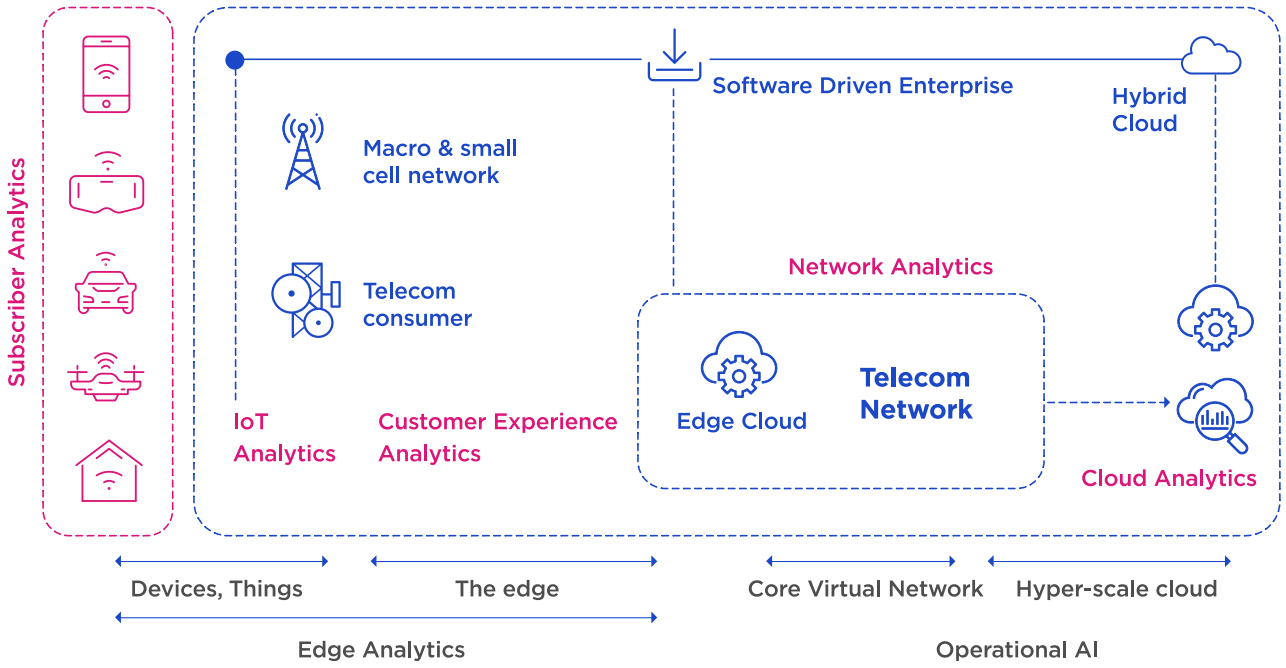
Nearly two-thirds of the global population will have Internet access by 2023. There will be 5.3 billion total Internet users (66 percent of the global population) by 2023, up from 3.9 billion (51 percent of the global population) in 2018. With the huge interest in digitalization across all industry verticals - 5G is a key technology. Edge computing is a crucial part of the 5G platform and provides a first-mover advantage for communication service providers in grabbing new business opportunities.

Edge analytics has become a major area of interest and investment in the telecom industry, driven by the need to improve user experiences as well as enable and support new business models. By 2023, 5G will make up around one-fifth of all mobile data traffic, where 25% of the use-cases will depend on edge computing capabilities.

## ...and the need for intelligent edge

Intelligent edge refers to the analysis of data and development of solutions at the site where the data is generated. Rather than constantly delivering data back to the central server, edge-enabled devices or nodes can gather and process data in real-time, allowing them to respond faster and more effectively. This technology reduces latency, costs, and security risks, thus making the associated business more efficient.

However, all of these capabilities have to be built into the hardware of the edge node itself (or into a "box" that is collocated with and connected to, the edge node). This whitepaper gives an overview of the implementation of Edge Analytics in the telecom industry.




*Edge Analytics vs. Operational AI*

Also, when it comes to cloud solutions, the role of location in the network matters a lot. As the volume of internet-connected devices increases, so does the need for greater access to edge computing, processing power, and database resources.

In some instances, the benefits of establishing connected endpoints for IoT devices won't be fully realized unless underlying infrastructure is located closer to the edge to reduce latency, improve availability, and support time-sensitive operations.

## Applications for analytics on edge

### IoT sensor data monitoring and analysis:

IoT sensors are already creating massive edge computing amounts of data, and with the number of sensors collecting data growing, data volume is set to continue growing exponentially. Moving data analytics to the edge with a platform that can analyze batch and streaming data simultaneously enables organizations to speed and simplify analytics to get the insights they need, right where they need them.

### Real-time contextual offers:

In the e-commerce industry, edge analytics provides unprecedented insights into customer behaviour using sales data, images, coupons used, traffic patterns, etc. This intelligence can help retailers better target merchandise, sales, and promotions and help redesign store layouts and product placement to improve the customer experience.

In the telecom industry, streaming analytics can be used to combine and correlate subscriber profile, CRM. Location, network and usage data in real-time to create a 360-degree subscriber-centric view of the information. It puts CSPs in a better position to identify and act on issues and trends that may impact a subscriber's experience, ideally before the customer becomes aware of them. Thus, an opportunity for CSPs to capitalise on opportunities to present relevant offers in real-time, thereby increasing revenues.

## Key challenges in edge computing

Edge computing in telecom provides execution resources (compute and storage) for applications with networking close to the end-users, typically within or at the boundary of operator networks.

Where there are advantages, there are disadvantages, and edge computing is no exception. Customers might need more resources on their device, potentially impacting on its size. Edge computing requires more local hardware

### For example:

- Edge analytics is essential while giving real-time based contextual offers to the customers. It requires the correlation of the data from multiple sources (devices. nodes, network elements, etc.) which requires more storage (three times the storage required at the central location) and high processing power.
- IoT cameras require a built-in computer to send video data over the internet as well as a more sophisticated computing process for more advance process applications, such as motion-detection or facial-recognition algorithm.

## Intellza offers the Intelligent Edge 2.0

Edge technology uses Lambda architecture to handle massive quantities of data by taking advantage of both batch and stream processing methods at the edge and centralized location. Considering it's a Hadoop-based solution, the architecture requires five servers, two master servers and three slave servers to maintain the HA. Implementing this architecture for HA at the designated nodes increases the hardware cost thereby increasing the overall cost of the solution. However, from great challenges are born great solutions.

Intellza offers a smart solution to this problem — The Intelligent Edge 2.0. This unique solution replaces lambda architecture by using Spark Single Node technology. Intellza can find its application in many segments such as customer experience, data monetization, lawful interception, network monitoring, etc.

For LI (Lawful interception) use case, CGANT and PGW/GGSN are correlated at the cloud-center site to generate end-to-end IP details. The IP details help the subscriber traceability with Timestamp & Date, Source Private IP, Source Port, MSISDN No, Destination IP, Destination Port, MACID, NATed Public IP, Location, etc.

Closing the gap between the way data is generated and where you can use it to act in an insightful way creates a competitive advantage. Hence, using the technology at edge, CSPs can introduce more use cases with huge potential.

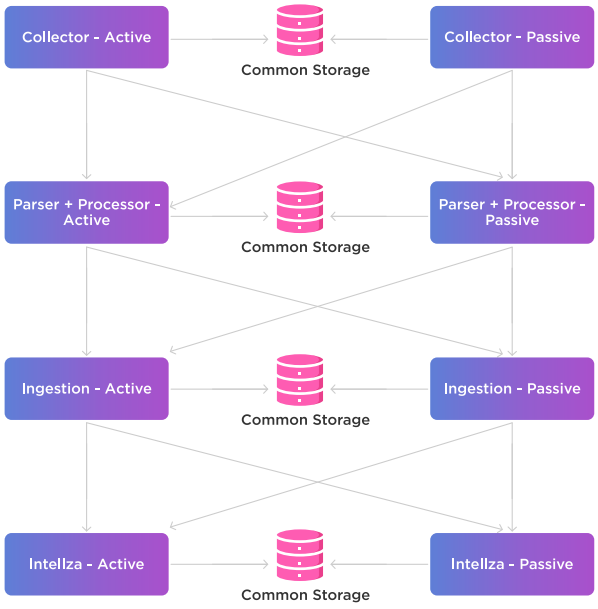
A correlation between CGANT and PGW/GGSN will happen at the edge node in the near-real-time which will bring more flexibility to cater to multiple use cases other than LI. For example, real-time contextual offer based on the subscriber location and URL/Mobile app access.

## Key Benefits - Intelligent Edge 2.0

- Reduce maintenance costs - The central site receives only correlated EDRs. Hence, there is no need to save and maintain CGNAT and PGW/GGSN data at the central site
- Reduce operational costs - Operators can save the bandwidth required between the Edge and Center sites
- Improve performance – Network vendors will not have to manage sessions to correlate CGNAT and PGW/GGSN data as correlation is performed by Intellza at the edge
- Flexible solution – It can adapt the new-age applications and use

## High-level architecture

Intelligent edge analytics will be deployed on the collector site having minimal hardware sizing which collects data from the different data stream, correlate, aggregate, analyse and store data which can be used for legal search and monetizing purpose.




*Type of deployments*

## Software Requirements

| |
|---|
| HDP 3.0.0 |
| Spark 2.3.1 |
| Hadoop 3.1.1 |
| Yarn 3.1.1 |
| Oozie 4.3.1 |
| MySQL/MariaDB 15.1 |
| Grafana 5.1.4 |
| Java 1.8 |
| Spark-Kafka 2.3.0 |
| Kafka Client 1.1.1 |

## Hardware Requirements

| A 2-Node Cluster with the following configuration: |
|---|
| OS – CentOS 7.x or higher |
| RAM - 32 GB |
| vCPUs or vCores - 12 |
| Threads - 1 |
| Processor - Intel Core Processor (Skylake, IBRS) 2GHz |
| Storage - SAS 15K RAID5 (1TB) |
| File System - HDFS |
| Compression Type-Parquet Snappy Compression |

## Conclusion

Intellza's unique Intelligent Edge 2.0 solution enables the organization to use edge computing technology while removing its cons — computing and storage cost. It also provides diversified use case ability in enhancing customer experience, monetizing data, optimizing the network, and legal search for lawful interception solution.

## References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## About the authors


**Keval Pambhar** is a Product Owner of Intellza, the Next Generation Analytical Intelligence Solution. He has more than 10 years of experience in the telecom industry across the various departments including Product Management, Delivery, Research and Development, Engineering, and Pre-sales. He is technically astute in all foundational aspects of the analytics world such as big data management, machine learning & artificial intelligence.



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