Data Sheet

Intellza

Transform Businesses with Actionable Data Insights

Overview

We are living in a data-driven digital world where all aspects of our day to day activities are driven by the internet and mobile apps. This change in consumer behaviour has steadily influenced new technologies -- Internet of Things (IoT), Big Data, 5G, AI and Machine Learning, among others -- leading to a series of digital transformation impacting almost all the sectors.

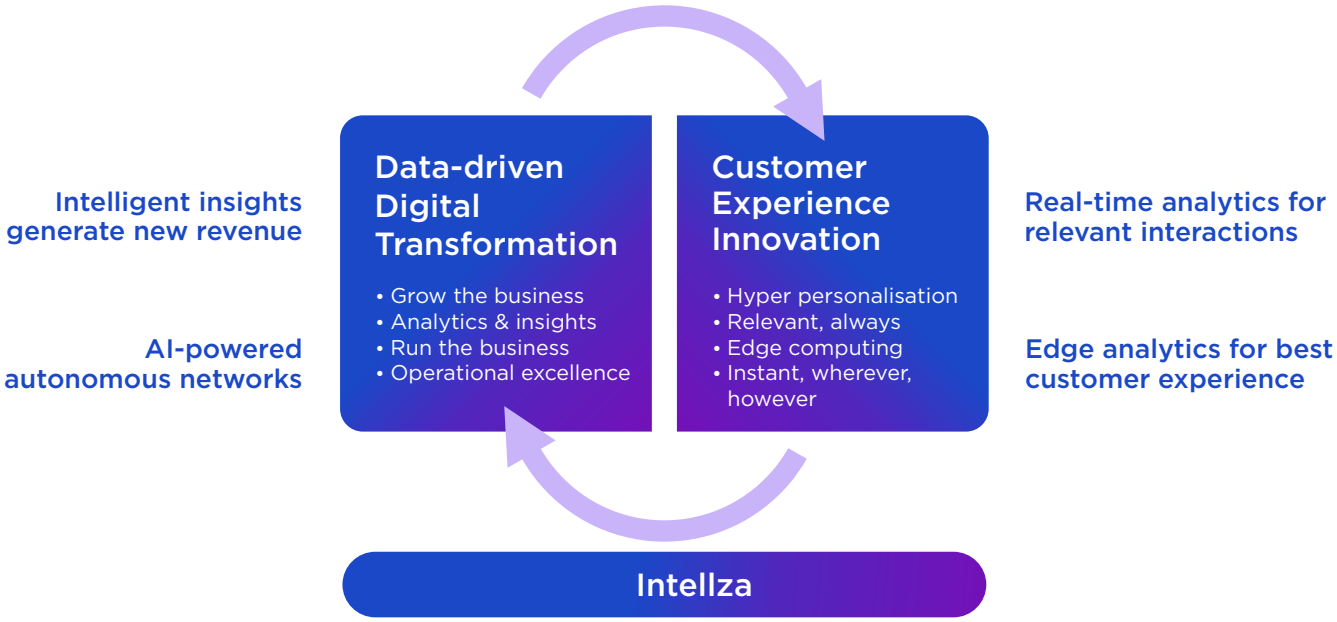
2.5 Quintillion of Data Created Everyday
The Volume of Business Data Doubles Every 1.2 Years
By 2020, Digital Universe will Equal 40 Zetabytes[1]

Data is fast becoming a valuable resource

In this highly competitive marketplace, there is a demand for rapid decision-making more than ever before. To be relevant and impactful, these decisions must be based on facts, which are buried deep within considerable volumes of complex consumer and business data managed by the Communications Service Providers (CSPs).

To get meaningful insights for faster deployment of new services or new plan creation, data is the power source and the approach CSPs has to transform into Digital Service Providers (DSPs). With data availability through Digital Systems, CSPs can analyse all the reports concerning their business and can react and create a vision for future-proof solutions.

CSPs that are able to digitise customer experience, monetise digital world, simplify and harmonise business processes, optimise network operations and adhere to regulatory compliances will be best placed to gain competitive advantage.



By 2020, over 50% of consumer mobile interactions will be in contextualised, "hyperpersonal" experiences based on past behaviour and current, real-time behaviour.[2]

Prerequisites of CSPs for a Data-centric Future

- System scalability to deal with voluminous digital partners (IoT, OTT, M2M etc.)
- Ability to scale up in sync with 100%YoY data growth
- Quick adaptability to changing technology/environment
- Align with regulatory compliance and data privacy
- Near real-time launch of products & analysis
- Generate insights from huge volumes of records in near real-time
- Multi-vendor systems - Integration with various IT/Network devices
- Effective management of data duplicity

In 2018, 50% of agent interactions were influenced by real-time analytics. By 2020, more than 40% of all data analytics projects will relate to an aspect of customer experience.[3]

Data Warehouse & Changing Market Requirements

Data, its sources and its points of consumption continue to grow more diverse. At the same time, analytical and operational uses of data extend across the enterprise and beyond, bringing wide-ranging necessities. With these changing requirements, traditional architectures for collecting data and supporting predefined uses no longer meet stakeholder needs. Instead, there is a need for a modern data management infrastructure that supports flexibility, diversity of data needs and connectedness.

Data warehouse, which is used by CSPs for data storage and analysis, support mostly known data (structured & transactional) and provides results for known questions (repeatable, for broad consumption). In a data warehouse, data doesn't arrive in its original form but it instead get transformed into structured data and loaded into the organisation's pre-defined data warehouse. This highly structured approach means that a data warehouse is often highly tuned to solve a specific set of problems, but is unusable for others.

Growing Importance of Data Lake

Unlike data warehouse, data lake can be applied to a huge volume of data and a wide variety of problems, mainly because of the lack of pre-defined schema, giving the data lake more versatility and flexibility. Data lakes are meant to solve problems that are not as structured or pre-defined as the data warehouse. It allows the CSPs to store the data in its original form and it is easily scalable for seamless data storage, which together set the platform ideal for effective data analysis and correlation.

To extract more value from resourceful data, there is a need for detailed exploration and application of different, often more complex analytic functions to get meaningful business insights. While analysing data, the analysts may have clarity on which question they need an answer, but they might not know what combination of data and analysis will reveal the answer. This is where the role of intelligent data lake gains prominence.

Typically, the market drivers for data lakes are data accessibility, data agility, data volume, data velocity, data variety, and growing adoption of IoT.

Data lake market is expected to grow from $3.18 bn in 2018 to $14.27 bn by 2023 with the current data lake market in telecom segment estimated at $565 mn[4]

Challenges bring Opportunities

With the rising volumes of data, diversified data formats and increasing data processing time, CSPs are challenged with new generation unstructured data making data processing, data management and data storing even more complicated.

The immense amount of data growth poses another challenge - data silos. In a conventional CSP, every department retains its own data and no information is shared with other departments. This increases the cost of storage and management of data, affecting data authenticity and increasing data duplicity due to lack of security and governance.

The huge volume of CSP data gathered over the years is kept as a cost incurring resource and not been used in any manner to enhance or streamline business

processes and customer experience. This points to the bigger challenges linked to generating meaningful data insights to effectively know the customers well and enhance their user experience.

However, this challenge can be transformed into an opportunity by proficiently utilising big data and analytics solution. The massive amount of data, when captured in its original form and analysed professionally, provides flexibility to refine data at later stages, move a large amount of data quickly, query the data in unlimited ways, sift through data quickly for smart search, build data-driven applications and achieve all of this with data authenticity.

In addition, data analytics allows CSPs to convert enormous structured, semi-structured and unstructured data into actionable insights enabling them to develop enriched 360-degree customer profiles, personalised marketing, customer churn predictions, optimise network capacity planning, new plan creations, new cell site suggestions, new product offering potential, sentiment analysis, clickstream analysis, high value customer analysis, cross-sell and up-sell business strategies, collaboration strategies and much more.

Data Silos

- Enhanced information sharing
- Removal of data duplicity
- Data security & data governance

Data Variety

- Quick on-boarding and data integration
- Cost-effective data management
- Faster time-to-market

Lack of Data Insights

- Data monetisation
- Enhance customer experience
- Improve network optimisation
- Optimise business operations
- Set-up regulatory compliance
- Customer retention
- Augment profit margin

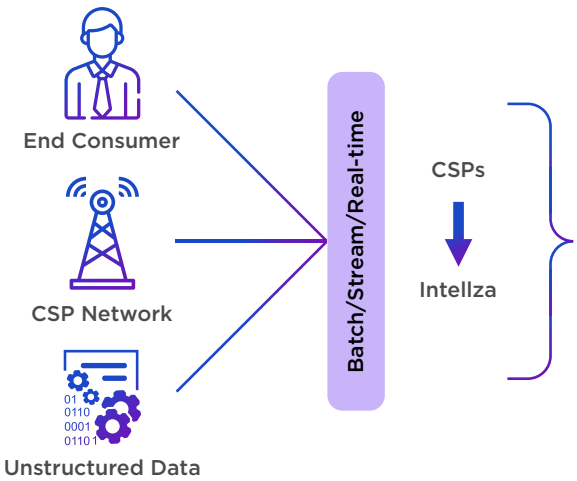
Intellza

Intellza is a business intelligence solution powered by DevOps, Analytics, Web-scale, Network Software (DAWN). It captures, models and protects data to provide meaningful insights and improve profit margins. By helping to streamline business operations, preventing revenue leakage, reducing time to market, and ensuring cyber security & compliance, Intellza improves the overall customer experience.

The smart business intelligence systems of Intellza enables smart decision-making, increases monetisation opportunities, optimises business and go-to-market strategies, and allows CSPs to craft real-time customer offers. Unified customer usage patterns from legacy networks available on a single platform allow CSPs to bundle packages including cross-selling, cross-discounts and a-la-carte offers to retain high-value customers and to increase average revenue per user.

Benefits of Intellza

Intellza enables deep understanding of customers and networks to enhance digital experience and cost to serve



Enables CSPs to

- **Capture online and network analytics** as a source of valuable insight to fix high traffic/congestion cell sites and improve service quality for end-customer
- **Understand and anticipate customer behaviour** across all channels
- Recognise what products attract each customer segment
- **Personalised and contextually relevant interactions** and experiences
- Manage the optimal balance between **service and cost to serve**
- Predict churn risk, customer satisfaction and customer lifetime value
- **Improve service levels and knowledge** of customer care employees

Value Proposition

- Increase in monetisation revenue up to 70%
- Artificial intelligence drives customer experience and retention
- Network optimisation using machine learning algorithms

Meaningful Business Insights

- Ready-to-use 50+ use cases for telcos
- Regulatory compliance can go live in 10 days
- Analytics POC to simulate real-life benefits for telcos in 2 weeks

Speed to Deployment

- Removal of data duplicity and up to 50% improvements in data integrity
- Enhanced data security & data control
- Data privacy (GDPR-compliant)

Data Security & Data Integrity

- Delivers regulatory compliances with agreed SLAs
- 360-degree customer dashboard for finer and precise investigation
- No data loss (99.9999% data accuracy and data retention)

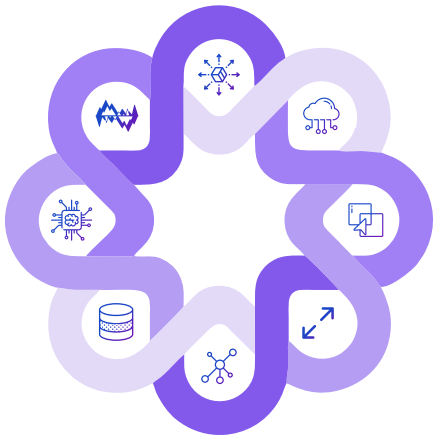
Compliance

- Up to 30% reduction in infrastructure cost
- Optimise operations with machine learning & AI algorithms
- Future-proof platform with cloud-ready solution

Reduced Total Cost of Ownership

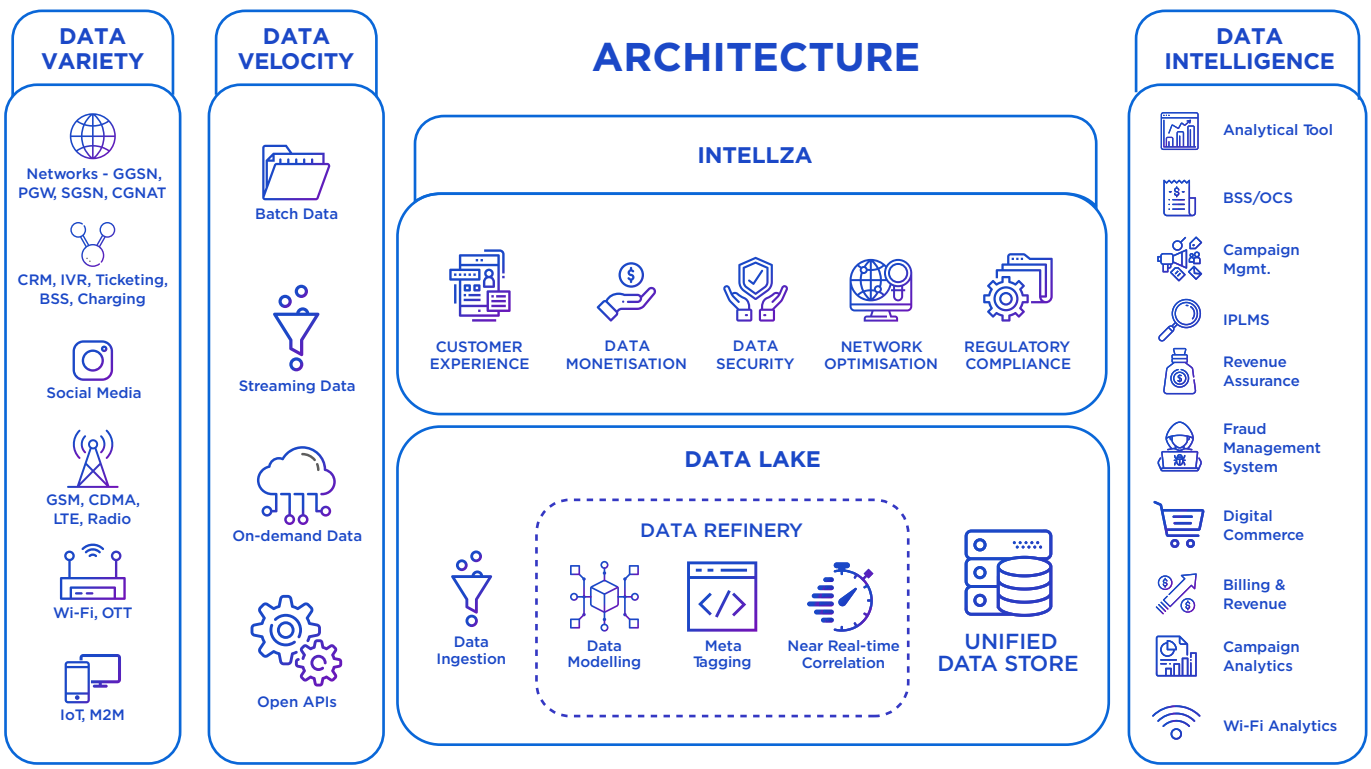
What are the advantages of Intellza?

- Unified Platform with Modular Solution
- Streaming Data Correlation
- Machine Learning & AI for Actionable Insights
- GDPR-compliant Data Governance



- Multiple Deployment Options
- Open APIs for Enterprise Integration
- Web-scale Data Storage
- Programmable Networks

High-level Architecture



Intellza has two vital components: Data Lake & Analyser

A. Data Lake

Data Lake handles the part of Data Management, Conversion, Processing and Storage. It mainly constitutes of segments such as Data Ingestion, Data Modelling, Meta-Tagging, Near-Real-Time Correlation and Unified Data Store. The Data Lake components are as follows:

1. Data Ingestion

The system has strong data ingestion capacity and process the data from a wider range of data sources such as GGSN, PGW, AAA, PCC, DNS, CGNAT, Wi-Fi, CRM, Billing, PCRF & Social Media etc. of different technologies such as 2G, 3G, 4G/LTE, VoLTE, CDMA, Wi-Fi etc. This section involves collecting structured and unstructured data into the system where it will be stored and analysed.

2. Decoder

It decodes all CDRs and data collected by the system. The system has predefined plugin base decoding functionality, supporting a wide range of data format for example binary, ANS.1, Ascii, Fix length etc.. Different sources may have the different format or protocol and hence, requires some type of transformation or conversion to be usable by the subsequent processes. Data will be stored in an optimum size for ensuring minimal sized data goes to a subsequent stream of the process.

Moreover, the decoder will have the provision of handling failure scenarios like a mismatch in data and configuration, missing mandatory fields in data or HDFS connection and so on. Decoding will be done efficiently, to ensure resources are utilised for big data streaming and analysis, rather than the efforts of data preparation and transformation.

3. Enrichment

The system supports rule-based enrichment for data transformation. The business user can conveniently configure the rules on GUI by configuring condition and corresponding action, so he/she does not need to have knowledge of any programming language. The system has an intelligent rule validator which will validate whether the business rule is configured appropriately or not.

The system manages the queue of event while processing events. The system will pick the batch of events from the queue based on priority and process it as per configured rules. This functionality improves the performance and there will be no data loss.

4. Aggregator

Data aggregation is a process in which information is gathered and expressed in a summary form, for purposes such as statistical analysis. A common aggregation purpose is to get more information about particular groups based on specific variables.

Purpose of this layer is to pre-aggregate data on the go in order to serve aggregation reports. The aggregate module performs computations against a set of values to generate an aggregated result. Aggregations can be applied to transform or to reshape the data.

5. Correlation

The solution will correlate all data received from all sources as mentioned earlier, to generate the 360' view of the business. The system supports dynamic correlation module where the user can define the parameter for mating the fields for two different records and fields required to carry forward through left, right or inner join for further processing.

Correlation is an important module for a data analytics, as it can help define trends, make predictions and uncover root causes for certain phenomena. It is required for correlation of DNS, CGF and CGNAT records to merge as a single log to derive required analysis.

6. Distribution

The solution will store the data once the data is successfully transformed through multiple phases such as decoding, correlation, enrichment, aggregation etc. and store into multiple destination systems as per configuration such as Hbase, Hive, Database etc.

The system will store the records into an error bucket if it encounters any error while distributing the data which can be reprocessed after solving the problem. The system will send SNMP trap to the monitoring system when a failure occurs.

The system will capture bellow KPIs and send it to monitoring system

- No. of records successfully loaded
- No. of fail record
- Average throughput

7. Data Repository

A big data repository is not a single solution but future-proof architecture suitable for today's business needs. The system's Hadoop base data repository allows storing data on a massive scale at low cost handling the variety, complexity and changes much easier as one doesn't have to confirm all the data to a predefined schema like star schema or snowflake schema.

The data lake stores data from many different processes into a data repository. This data is distributed and duplicated amongst the data lake repositories. When data from a system is copied into the data lake, the admin is responsible for its quality and management. The external system can access the data from repository through file or API.

B. Analyser

Analyser is the brain function of the analytics to deliver meaningful insights to any analytical tools and campaign management solutions.

Smart & Converged Platform will be used to generate dashboard based reports that can be used to understand & analyse the changing trends of data usage by various subscribers. It will help to achieve better business outcomes with end-to-end insights based on one holistic view.

Graphical Dashboard based GUI Tool will be compatible with multiple web browsers as well as the reports obtained is in easy-to-download report formats. The storage of data records can be done in RDBMS. The files can be exported in .csv, xls format.

Common Analytics Data can be used to generate different reports as per categorisation e.g. Marketing, Finance, operations, IT, etc. will have different reports as per their job role specifications and hence optimize the performance.

The system also supports Machine Learning to manage big data better. Moreover, the system is intelligent enough for self-learning and improve accuracy. It deeply gets insights by correlating the data, crunching numbers and understanding patterns of the data. The data thus obtained helps business take quick decisions.

Key Components of Analyser

8. Descriptive Analysis

The descriptive analysis summarises or describes raw data and makes it something that is interpretable by business user. It analyses past events, here past events refer to any point of time that an event has occurred, whether it is one minute ago, or one month ago. Descriptive analytics are useful as they allow the operator to learn from subscriber past behaviours, and help them in understanding how they might influence future outcomes.

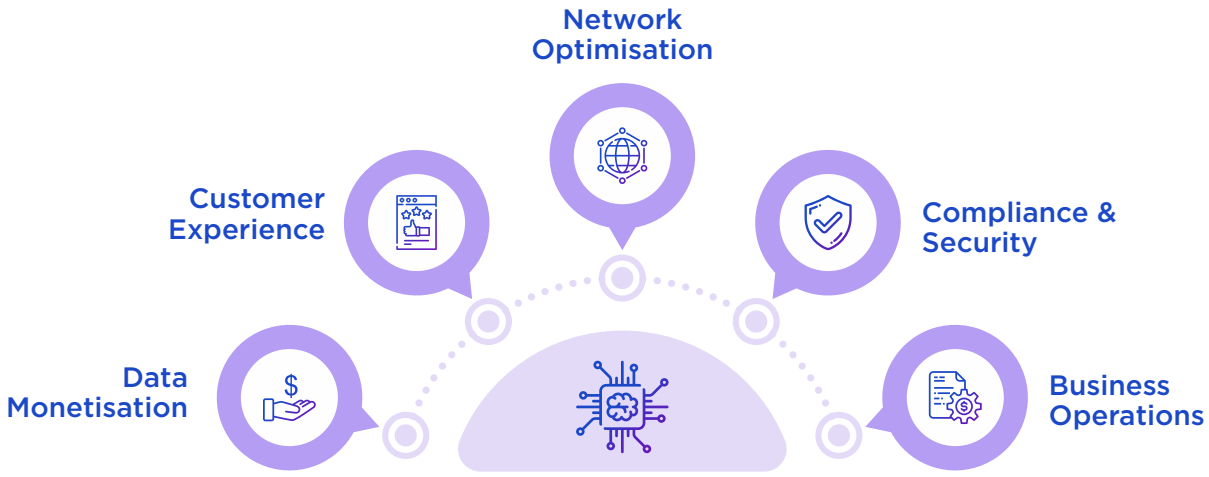
9. Predictive Analytics

Predictive analytics has the ability of “Predicting” what might happen next. Predictive analytics is about understanding the future. Predictive analytics provides the operators with actionable insights based on data. Moreover, it also provides estimates of the likelihood of a future outcome. Operators can use these statistics for forecasting what might happen in the future. This is because the foundation of predictive analytics is based on probabilities obtained from data. One common application of predictive analytics is to produce a credit score for customer. These scores are used by operators to determine the probability of customers making future credit payments on time.

10. Prescriptive Analytics

Prescriptive analytics (Proactive care) facilitates users to “prescribe” different possible actions to implement and guide them towards a solution. The prescriptive analysis is all about providing advice. It attempts to quantify the effect of future decisions in order to advise on possible outcomes before those decisions are actually made. It not only predicts what will happen, but also tells why it will happen, and thereby provides recommendations regarding actions that take advantage of these predictions.

Prescriptive analytics can have a large impact on how businesses make decisions and thereby help them in delivering the right products at the right time, consequently optimising the customer experience.



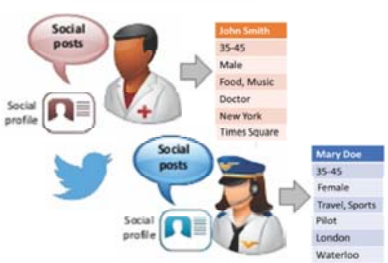
Data Monetisation

Intellza enables CSPs with a competitive advantage, more effective cost structure by optimising the business processes and allow CSPs to venture into new business avenues based on targeted customer preference. By enabling CSPs with real-time decision-making, Intellza allows them to provide real-time contextual offers, personalised experience, cross-selling, up-selling, and personalised offers to competitors' customers

Contextual Offers

What is the Problem?	Root cause of the problem	Business Benefits
• Lack of Real-time Customer Engagement • Reduction in ROI from Conventional Services	• OTT Player's Offerings • Changing Customer Behaviour • Digitization in Services	• Cost-effective & Precise Marketing • New Revenue Stream from B2B2C – Restaurants, Taxi, Insurance, Shopping, Credit Cards etc. • Increased Customer Lifetime Value

Subscriber Profiling



Ad Campaign

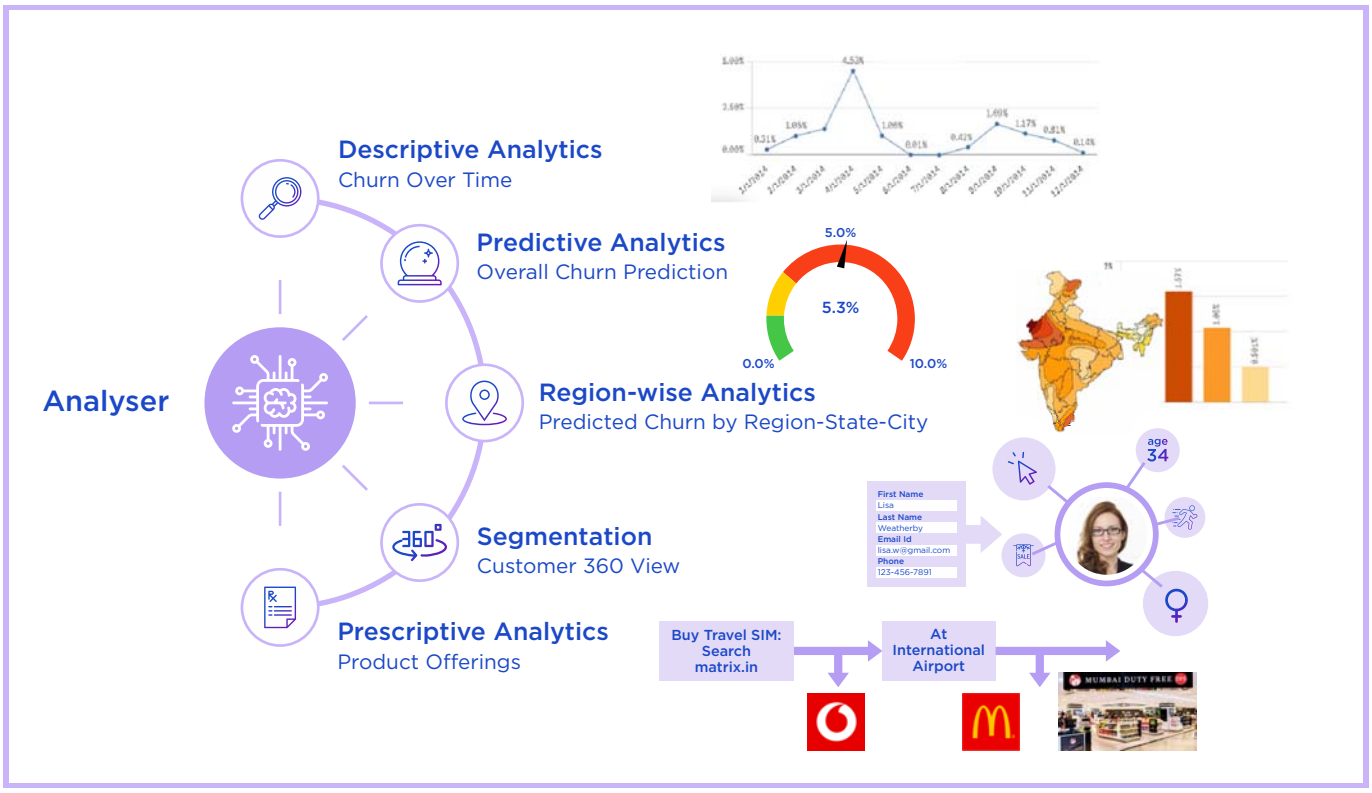
Campaign Score

Customer Experience

CSPs can launch personalised products and services such as location-based and event-based campaigns, directing customers to cross-sell (related feature/product) and up-sell (upgrade, new feature/product) offers. Intellza helps CSPs to reduce customer churn, improve customer care experience, and enhance loyalty and reward system.

Predictive Customer Churn Analytics

What is the Problem?	Root cause of the problem	Business Benefits
• Reducing Customer Base • Product & Service Profitability • 3X Additional Cost for Acquiring New Customer	• Inferior Quality of Services – Data & Voice • Lack of Personalized Marketing • Better Competitive Offers • Lack of Service/Complaint Resolution	• Improve Customer Retention by 15% • Accelerate Time to Market of Churn Analysis • Know your Customers' Changing Requirements, Preferences and Actions



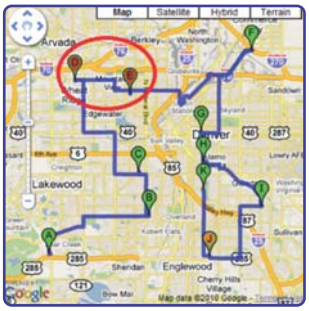
Network Optimisation

By strengthening service-based quality control, new cell site planning with cell-level traffic forecasting, gateway planning and optimisation, real-time monitoring and corrective action, and VoLTE analytics; Intellza plays a vital role in optimising the overall CSP network.

Network Switching Frequency

What is the Problem?	Root cause of the problem	Business Benefits
• Slow Mobile Data Speed in Geo Locations • Voice Quality Hampers in Geo Locations • Call Drops, Call Mute, Call Lags due to Network Coverage • Network Coverage Gaps between Cell Sites	• Frequent Network Switching from 4G to 3G or 2G due to Network Coverage	• Enhance Customer Experience with better Data Quality • Consistent Voice Quality during Calls • Suggestion for New Cell Site Planning

Premium Subscriber Journey



Location-wise Toggling Rate

Device-wise Toggling Rate

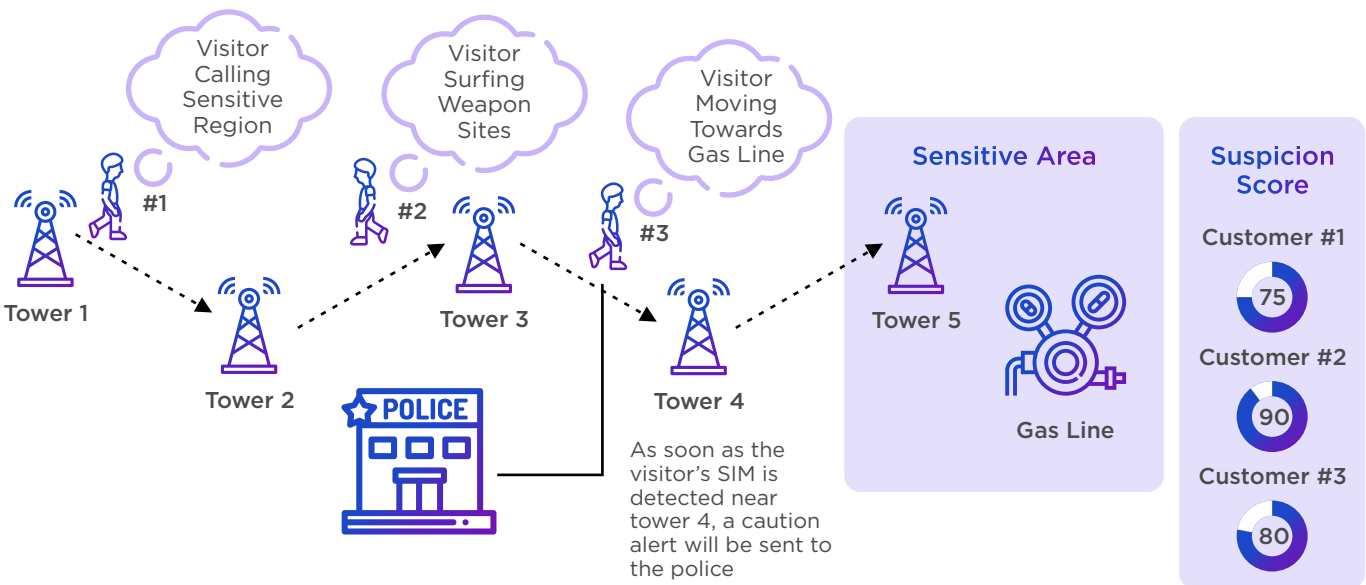
Device	Toggling Rate
Device 1	56
Device 2	46
Device 3	20
Device 4	12
Device 5	18
Device 6	3

Compliance & Security

Compliance and Security are the key priorities of CSPs as data is redefining their business models. When it comes to privacy, retention and quality of data, CSPs have to be careful in handling the high volume of valuable data. Fraud prevention on tax payment to the government, monitoring LI service quality norms, device/OS-wise destination IP watch, and provide user data (voice call, data usage and location details) based on LI request are some of the compliance and security features of Intellza.

Threat Detection of Visitors in Sensitive Area

What is the Problem?	Root cause of the problem	Business Benefits
• Security Concern of the Sensitive Areas (Gas Lines, Power Stations etc.) • Disharmony in Public due to Hamper of Services	• Call to & from Sensitive Regions (Syria, Iraq etc.) • Visitor SIM No. Movements Near Sensitive Area • Visitor SIM No. Surfing Terrorist Sites, Weapon Sites, Social Media Followers of Terrorists	• Proactive Alerts for Presence of Nearby Suspicious Person • Analysis of People with Propensity (Percentage) to Crime for Better Security



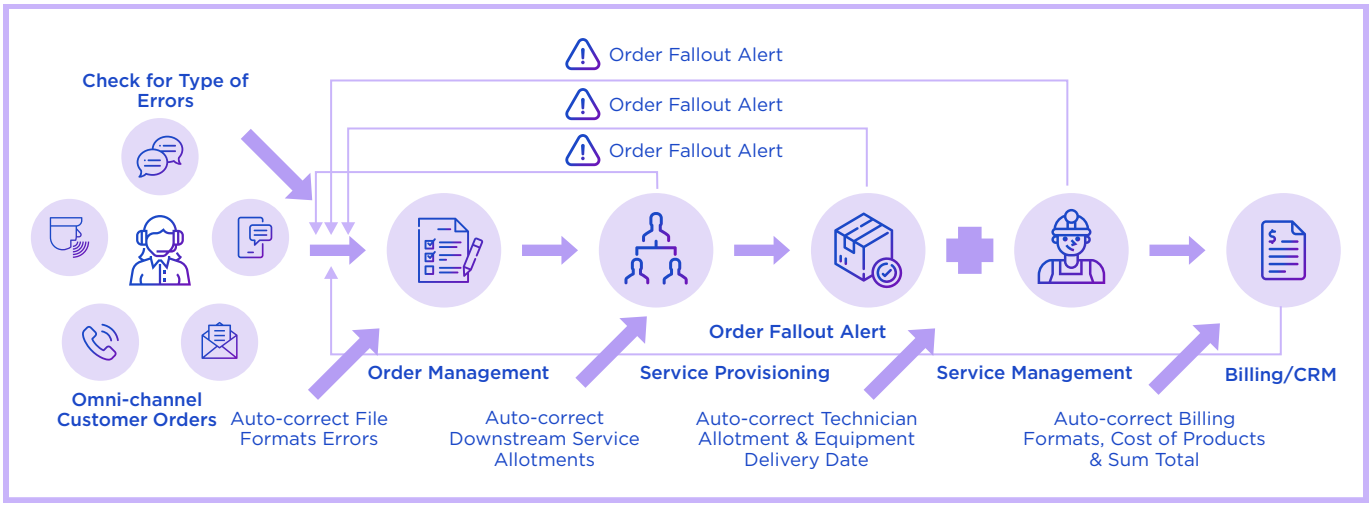
Business Operations

Intellza enables CSPs with more targeted marketing activities and improves business operations, reduces costs by identifying expense and revenue leakages, suggests new plans, optimises customer care and prevents bill shock.

As the world is fast becoming an IoT-enabled networked society with highly connected smart devices and personalised gadgets, CSPs have a pivotal role in leveraging the unprecedented benefits of data. Modernising the tools, platforms and best practices are inevitable for making CSPs' digital transformation effective and meaningful.

Including Data Lake in both new and pre-existing data ecosystems is an important aspect of data monetisation and business optimisation efforts. With accurate predictions and tailor-made offers and pricing, Intellza empowers CSPs with improved customer service, new data monetisation avenues, and higher levels of customer satisfaction, creating a loyal customer base.

What is the Problem?	Root cause of the problem	Business Benefits
• Revenue Loss due to Order Fallout • Customers Losing Trust due to non execution of orders	• Source of the Data is not being tracked for Order Tracing • Errors Handling Time & Delay • Manual Changes in Process for Error Correction	• Improving Day-to-Day Decision Making • Optimizing Business Operations with Current & Future Errors Prediction and Correct with Intelligent Automation • Prevent Revenue Loss • Enhance Customer Experience with Timely Order Fulfilment



References

[1]eMarketer
[2,3,4,5]Gartner

STL
www.sterlitetech.com

Sterlite Technologies Limited (STL) is a global leader in end-to-end data network solutions.

We design and deploy high-capacity converged fibre and wireless networks. With expertise ranging from optical fibre and cables, hyper-scale network design, and deployment and network software, we are the industry's leading integrated solutions provider for global data networks. We partner with global telecom companies, cloud companies, citizen networks and large enterprises to design, build and manage such cloud-native software-defined networks.

STL has innovation at its core. With intense focus on end-to-end network solutions development, we conduct fundamental research in next-generation network applications at our Centres of Excellence. STL has strong global presence with next-gen optical preform, fibre and cable manufacturing facilities in India, Italy, China and Brazil and two software-development centres.

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