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Executive summary

Big data although poorly defined has created considerable interest in both vendors and Communication Service Providers (CSPs) and has got big data onto the agenda of most CSPs at board level. However, tight fiscal conditions, coupled with the unsettled nature of vendors, are causing some delays in decision making. This does not detract from the increasing realisation by CSPs that the data that they is hold is valuable and should be used to optimise current internal processes or should be offered as a service for external consumption.

The market for big data analytics (BDA) tools is immature with little information on what the best uses are for CSPs to give vendors guidance on what to focus on when building their solutions. There are many different ideas about what uses are most valuable, leading to a highly fractured market for vendors to address and one that is less attractive for them to develop applications for. This has resulted in few out-of-the-box applications on the market. This in turn continues to make implementation more costly and complex for CSPs and therefore they are less likely to implement them.

Making a business decision on prioritising which project or use case needs addressing must be taken by CSPs to provide the impetus for vendors to develop better solutions and in the medium term this will provide CSPs with better more developed applications to deploy.
Big data analytics skills are scarce, which increases the costs of implementing and operating new solutions for CSPs. This requires organisational change in most CSPs to create a cross departmental, centralised BDA department. The expensive resources and skills can then be utilised across the complete organisation and not restricted to a single functional department, such as marketing, which occurs today. In addition this improves the sharing of data from across the enterprise. BDA can only improve current processes if it is able to apply new data and with better analytics models, the sharing of data is therefore is an integral part of any implementation.

Introduction

This report looks as how BDA can be used within the CSPs to create value. Big data is not new within telecoms, CSPs are one of the heaviest users of data, but the advent of the recent hype has helped raise the topic high on to the agenda of every major CSP leaving four key questions to be answered.

- What are the business challenges that big data analytics should be used to solve?
- Where is the data needed to build optimum analytics models?
- What is the right business structure to support this requirement?
- What software tools are there to support BDA?

The use of BDA has grown over time within CSPs and should be viewed as evolution of technology and businesses requirements. Technology is driving increasingly sophisticated subscriber devices that are using communication networks in new ways and becoming part of the fabric of every telecoms market, both developed and emerging. The types of services that are now available are increasing and the content and applications that use them changing in variety rapidly. Technology changes also provide the ability to monitor, store and analyse data cheaper than ever before allowing for much greater detail on every aspect of a consumer, device, network or services to potentially be used to optimise every process that is impacted by it.

Business requirements are driving CSPs into needing to better utilise their resources, as the once powerful growth of telecoms services are in now decline in some mature markets. This saw headlines such as the Dutch mobile market declining by 4.5% in 2012 (reported in the Dutch daily news), or Spain losing 5% of its mobile subscribers in 2012 (reported in Forbes). These financial pressures have shifted an agenda based heavily on growth, to one more based on extracting greater value from current assets. BDA is widely seen as one of the tools that can be applied to current processes on order to do this. In addition BDA can be used as a revenue generation tool to provide potential new streams of income from outside more traditional telecoms services.

This report looks at the issues in three sections: an overview of what big data is and what elements are needed to deliver a successful project, what the key business uses are for BDA within telecoms and finally what systems are needed to deliver a solution.

Creating a big data analytics solution

There are three elements that need to be considered when creating a BDA solution and all three elements will need to work for a project to be successful.

- **Data** – Every project needs to consider the implications of the data that is needed. This is broken into a number of factors:
  - The availability of data, where is it currently held and can it be accessed in the time and format needed.
  - What are the impacts of using this data; does the collection affect network performance or other operational systems?
  - The costs of acquiring, storing and manipulating the required data.

  Often data is not widely available between departments within the same CSP, restricting the data sets that BDA can applied to. Sharing data across departments, particularly network and customer data, will enable solutions to use a richer set of attributes with which to model and optimise business processes.

- **Staff and skills** – To create and manage models and applications needs staff with a deep understanding of data and the implications of changes within it. Big data projects need to find appropriate resources internally with CSPs or rely on software or systems integrators to provide the expertise that is required. This is an on-going commitment as data and requirements change and inevitably models need continuous refinements. The implications of this are that highly skilled resources are expensive and need to be used as efficiently as possible across the CSP.

  CSPs that have taken a more strategic view of BDA have often come to the conclusion that organisational change may be necessary to best utilise the resources they have and have therefore created a centralised function.

- **Software** – The tools needed to support a data driven project to provide the acquisition, consolidation, storage analysis, visualisation and automations that are needed to deliver the project. Software tools are considered later inthis report.

Definition of big data and its implications

Big data is described as having three characteristics:

- **Volume:** The large volume of available data is a key characteristic of big data.
- **Variety:** Data comes from various different sources – CDRs, data sessions, social networks, internal reports, transaction based systems and in different formats (alphanumeric, XML, audio, etc.).
- **Velocity:** The velocity, understood as the frequency at which data is generated. The high frequency of data capture brings new opportunities in terms of real-time management and reporting.

This combination of big data characterteristics is driving substantial changes within the IT requirements, with the greater use of unstructured or semi-structured data changing storage and modelling requirements. Unstructured data had not been stored or had analysis done to it as it was constainly being updated with often the latest reading deemed to be significant. This transient data, sometimes refered to as 'data in motion', can however have a much higher value if it is acted on quickly. In the past the cost to do this in near-real-time was prohibitive, making business cases poor and the value of the data low.

This requirement for near-real-time analytics to be performed on large data sets combined with a need to act of the results for huge volumes of data is moving the BDA to need tight integration into business process management engine as an integral part of the system. In the past most processes were done off-line and required manual interventions, new uses need to act faster, as a lower costs and on larger number of insights need to be automated.

Figure 1 shows the move to process driven and in-line analytics where processes are automated from insights derived from analytics tools and systems.

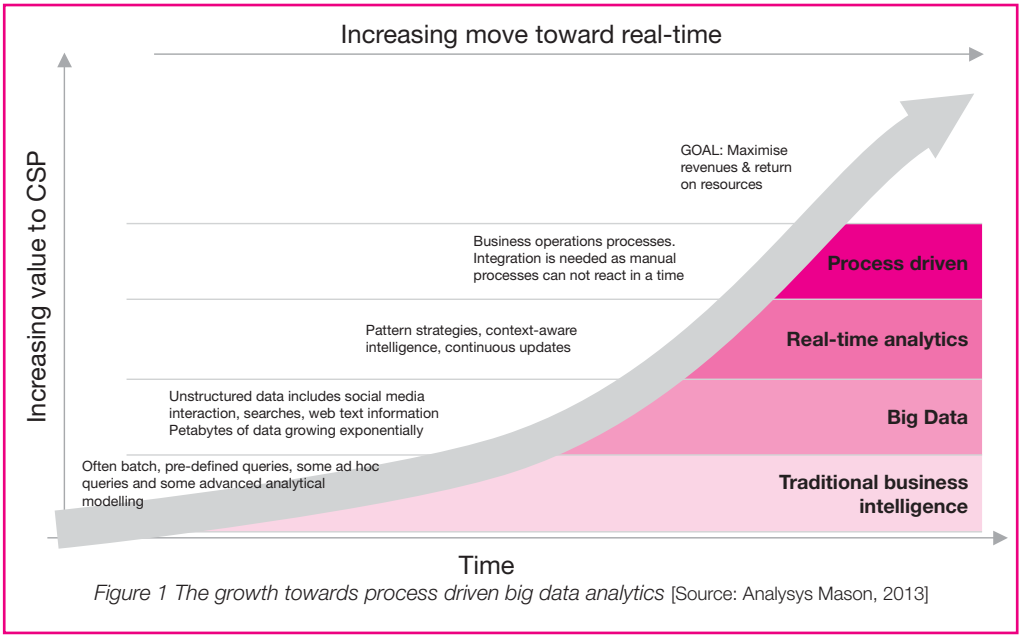

Figure 1 The growth towards process driven big data analytics [Source: Analysys Mason, 2013]

Business drivers and use cases for big data analytics

Analytics and business intelligence tools have been used within CSPs for many years and are established within CSPs today. The most established and recognised users of analytics at CSPs are the marketing functions, where tools are used to provide segmentation and market analysis to help prevent churn and provide new campaigns to increase the sale of new services and products. BDA must be considered across all departments within the CSP to create value. Use cases where big data attributes are added to the current decision-making process or analysis will provide better decisions and better outcomes for the CSP. If current data processes are not supplemented by new data it is unlikely that the performance of the CSP will be improved. Key big data sources include both internal data such as customer data and operational data such as that collected from the network, but can also incorporate market data that can provide additional attributes to the analytics models.

CSPs need to consider which use cases provide them with the best returns for their organisations, most of which will supplement or improve current established processes, but some will provide additional revenues in their own right. There are hundreds of different use cases that CSPs could select for projects, prioritising which ones provide the best return. There are five broad categories of use cases, including: marketing and sales, customer services, financial and regulatory requirements, operations management and external digital services.

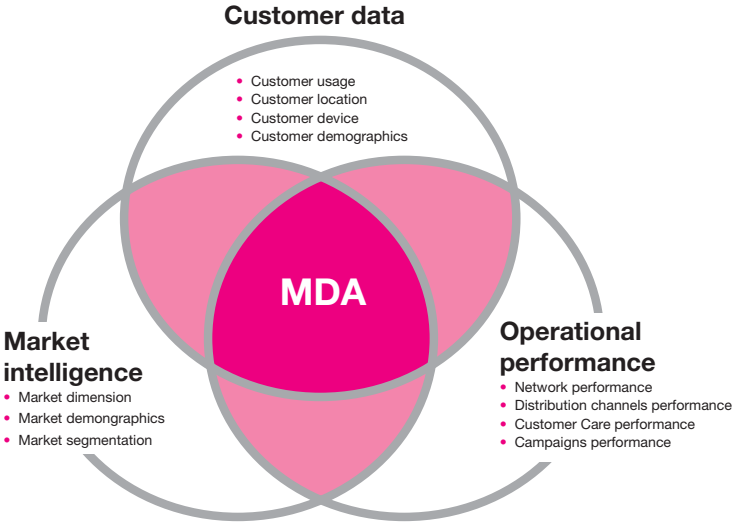

Figure 2: CSP performance is enhanced by integration of new data sources [Source: Analysys Mason, 2013]

Marketing and sales

The marketing and sales functions drive revenue into the CSP and are often already heavy users of analytics and data. The ability to provide micro-segmentation and context-aware approaches with targeted offers is an opportunity for BDA solutions.

Data attributes used within marketing and sales functions are potentially near infinite. Some examples of the newer data analysis that can be used are in the table below:

Data attribute	Description	Improvement with big data
Location information	This provides the ability to segment service offerings based on where subscriber is located.	This enables regular commute patterns to be profiled to make offers when at home or in the office. Location-based adverting can create value through encouraging take-up of offers, or encourage a visit to a local CSP stores.
Social network analysis (SNA)	This provides analysis of whom, how often and when subscribers call others.	This provides a social hierarchy that enables campaigns to be targeted at prospects that can exert greatest influence on their social groups.
Social media – sentiment analysis	To provide analysis of comments on social media in regards services or products.	This provides analysis of the data to ascertain if they are negative or positive.
Content usage	Dependent on technologies such as DPI to understand what content and which applications or web addresses are used by each subscriber.	Analysis of this provides the ability to created appropriate offers, such as heavy gamers can have a package targeted to them.
Network data	Network data covers a broad set of attributes but can include network utilisation of cell sites for example.	Through using this short-term time sensitive offers can be broadcast to user on a cell to get them to use-up voice or data quota when the network is not busy.
Network service quality	Poor network service is often one of the major attributes in churn, where a subscriber has suffered a repeated poor experience, especially at home locations.	The ability to analyse when a customer has suffered poor service and predict the impact this may have on their likelihood of churn.

Typical use cases enhance current processes that are established with in the telecoms market today and are included in the table below.

Use case	Description	Improvement with BDA
Segmentation	The most significant use of analytics by CSPs is to provide better segmentation of their customer base to provide more effective marketing campaigns. As markets become saturated more targeted marketing is required to ensure offer-take-up.	Demographics based segmentation misses several relevant customer dimensions and might give wrong indications regarding the customer true behaviour.
Cross/up-sell products	As voice becomes a mature product, operators may find that the best potential for value creation is through the expansion of other services (broadband business services, etc.).,	Already used successfully by Amazon and other retailers, operators can analyse the profile of customers using certain services, and use it to offer the product/service to customers of the same profile.
Decrease churn	Churn is a general concern in both emerging and developed markets. Due to the large concentration of revenue, even small changes in churn rates can have a significant impact in the bottom-line.	Look at modification of usage patterns, combined with customer profiling to identify algorithms that can help predict churn.
Campaign management	This function provides the execution and management of offers and the rate that they are converted or acted on by the targets.	Mass market batched based processing of static campaigns can be changed to dynamic data to react to customer behaviour and dynamical change offers if they are not working.
New service creation/ design	For instance, understand where and when the network is being underutilised and create localised offers to encourage subscribers to use up data or voice minutes.	The ability to dynamically analysis network data on for example a cell basis and automate a pre-defined offer broadcast to the same cell.
Channel analysis	With multiple different options to reach customers through, email/SMS/applications etc. understanding what is best for the service type and customer segment.	To provide analysis of the different sales channels that best suits individuals.

Customer care services

Customer care service can be enhanced through the use of big data through use cases that provide a clearer understanding of why customers call in, and being able to deflect their call in an automated way or resolve their call faster.

Use case	Description	Improvement with BDA
Improve customer experience	As markets grow and mature, improving customer experience can be key in attracting higher value customers	Understanding the customer behaviour and the experience in the different touch points, through numerical quantitative measures helps driving the organisation towards a more customer friendly experience.
Proactive customer care	Where customer experience has been sufficiently impacted, provide a proactive, automated response to prevent them from calling the CSP	Collating of all customer touch points into a single view of the customer and understanding why they may call in, or provide the customer services representative with the most likely cause of the issues if they do call in helps reduce customer call times and improves customer satisfaction.

Financial and regulatory requirements

Finance departments have been heavy users of analytics, often the same department will manage revenue assurance and fraud as well as requirements that are needed by governments for data retention.

Big data analytics adds to types of analysis can be done, providing greater granularity and detail. An example of this is outlined below

Use case	Description	Improvement with BDA
Capital asset management	The need to expand network, while at the same time keeping costs low, can be supported by BDA.	The network assets are the largest asset of any operator, understanding the exact status of each item of network inventory ensures it optimal usage. In being able to understand if any network assets can be reused, relocated or transferred from un-used spares or other source enables network assets purchases to be delayed or avoided unnecessarily.

Operations management

Performance and assurance systems have always used real-time systems to collect huge data volumes and rules have been applied to reduce the number of events they have reported, these systems and others can however be improved through more sophisticated modes with greater amounts of data attributes.

Use case	Description	Improvement with BDA
Network planning optimisation	The need to expand network, while at the same time keeping costs low, can be supported by BDA	Customers' location based information and profiling can help operators optimise the network roll-out. CSPs need to define first the profile of customers they expect to take the new technology and build based on incremental revenue that is expected.
Improve customer experience	As markets mature, improving customer experience can become the only differentiator in the market.	Understanding what network issues impact which customer, in which locations and running which services provides prioritisation for resolutions Better use of external factors such as weather, sports games, release of new devices, launch of new games and access to new content all potentially impact service quality.
Network performance predictions	There are many factors that can potentially impact the performance of a network, in tracking different data trends a prediction can pre-empt a potential issue allowing for staff to repair or react before it happens	BDA allows for many more attributes to be tracked and monitored, both internal and external to the CSP, helping to refine the models currently in use. These can include the launch of new devices on their network, the impact of a new game or application or the availability of new content.

External digital services

Big data analytics opens up the possibility to offer new service types, potentially the use cases can be based on any of the segmentation criteria used internally with at CSP, so long as privacy issues are addressed. CSPs have found that location-based information is the most compelling use case for selling data externally.

Use case	Description	Improvement with BDA
Mobile advertising based on location	The need to provide segmentation based on location and other information for use for advertising by partners. This is often referred to as geo-fencing, or proximity based marketing. There are a number of different models for this type of service that include: providing data fo a third-party to run specified offers on, or for the CSP to run the promotions and receive a commission commission from partners if they purchase using the promotion.	Customers' location based information and other profiling criteria provide a compelling proposition to sell externally. All the other data attributes can also be used to profile targets, which may include external data such as if the subscribers, are members of a store loyalty scheme that is using the data service for example.
Location-based marketing information	Understanding the location of mobile phone users and tracking them is valuable information for infrastructure planners. Mobile phone operators are able to collect data on all their subscribers, track their movements, make anonymous and provide data externally. This is used for governments planning transport or retailers trying to understand potential store sites.	Customer location is clearly the most important criteria, but other criteria such as starting location (for example at a football match) or any other data attribute that can be used to segment the user base can potentially be used to provide greater value to help sell the service.
Trending of M2M data	This is where sensor data can be used to monitor different aspects of an M2M offering. The oldest example of this is using location information to provide traffic speeds to satellite navigations systems.	Big data analytics is able to provide the collated information experience of multiple drivers based differences in location and overlay this information onto a road location to give average traffic speed. This system needs to work in all locations and be provided in near to real-time.

Software tools and systems

The market for BDA tools is growing and changing rapidly, large software vendors Software AG, Oracle Corporation, IBM, Microsoft, SAP, and HP have spent more than US$15 billion on software firms specialising in data management and analytics in past five years. The software industry across all sectors is estimated to be worth US$100 billion and growing at 10% per year. The telecoms sector is a significant user of these systems. Understanding where each player sits is complex as they evolve leaving many CSPs unable to make a choice on their technology until clear leaders come forward in the market.

Large data warehouse projects were set up in the past with considerable investments that are only now starting to pay back often tempers enthusiasm for new projects. Current data warehouse systems also need to be considered as an integral part of the big data analytics infrastructure to continue to use this investment and source of structured data.

The tools that CSPs select for their big data analytics are driven by the use cases that are being supported. Critical in the selection of tools are:

- the type of data
- the volume of the data
- the timeframe that analytics needs to be run on the data.

Different technologies provide more cost effective support and so it is inevitable that CSPs will need to adopt a hybrid approach to their big data solutions.

Supporting each use case requires four major steps to be achieved.

- The acquisition of the appropriate data sources and the ingestion of that data.
- The storage of data. Most often the data will be stored, however where there is a real-time requirement this data may be analysed in-memory and then stored later.
- The data is then analysed through analytics techniques or business intelligence and the insights are passed to presentation tools.
- This presentation tool most often is a report, but in the case of many real-time use cases this needs to trigger a workflow.

The major components of the big data analytics solutions are outlined in the Figure 3.

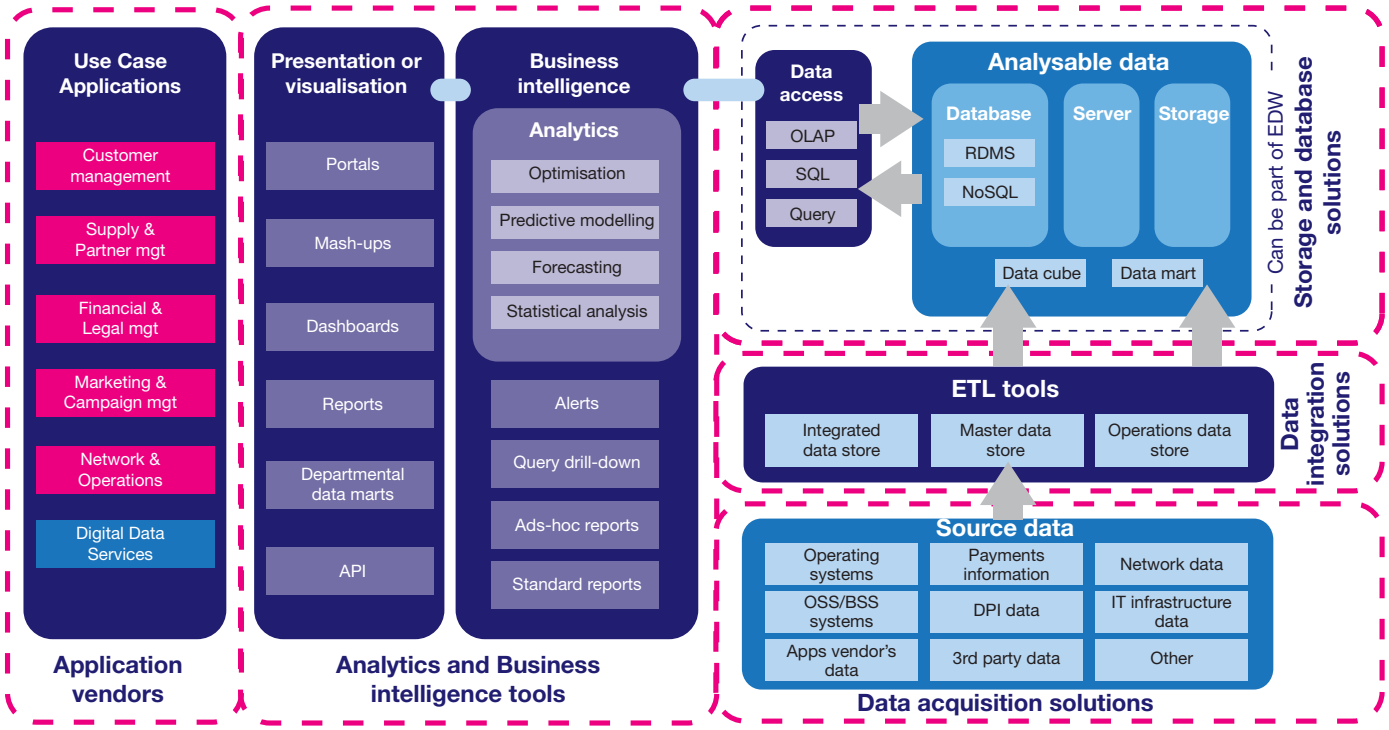

Figure 3: Key components within big data analytics solutions [Source: Analysys Mason, 2013]

One further component and potentially the most significant are application vendors. It is not necessary to build a platform approach to support every use case. Application vendors that need to support their specialist area often build this capability to their products, or hide the technology needed to deliver it. Ultimately CSPs do not buy technology for its own sake but to solve a business challenge. If the application vendors have created a solution that uses big data technology, such as the Hadoop's distributed framework, to solve a business issues there may be considerable advantages in having a complete application solution from a vendor who can then support the solution and turn industry knowledge into software, helping to reduce the time to market and the skill potentially needed.

Where an application is not available, or viable, CSPs have to utilise a big data platform and build the use case themselves or with a partner. It is inevitable that most BDA uses case become tailored for each CSP as their requirements, data and visualisation make for a unique environment. Where platform vendors can help to accelerate the time development and deployment effort is important, through the use of pre-defined models, dashboards, data sets and integration to business process management systems to deliver automations where needed.

Big data analytics components

This section looks briefly at some of the components of the architecture and provides some guidance on the solutions that are found within them.

Hardware

Hardware costs have steadily fallen over the past ten years, the use of massively parallel processing (MPP) has helped drive this, there have been significant changes within the market and vendors have added big data analytics capabilities to their products. Notable examples are EMC with Greenplum, HP with Vertica, Teradata with Aster data, IBM with Netezza and SAP with HANA. The alternative is to use a distributed framework and low cost commodity hardware with Apache Hadoop or Kognitio or others. The Hadoop-based approach is however not considered enterprise class by some and prefers to use the Cloudera, MapR or Hortonworks distributions that include support and services as well as other components is a more controlled release of the software. These companies also contribute to the open source community with software such as Apache ZooKeeper for high availability Hadoop support.

Hadoop based systems provide low cost storage and search capability for large data sets, but suffer more from latency than more tightly coupled systems, this has to be considered when selecting hardware platforms. A big data platform will often contain new Hadoop systems as well as more established data appliances.

Data management

These components are an integral part of the larger hardware solutions, with implementations of RDBMS (relational database management systems) for online transaction processing and include databases, data integration and data governance and

include vendors such as Informatica and IBM. Where data appliances are being use the MPP platform will have an associated MPP database that is tuned for best performance on the hardware, but often will support only structured data, newer technologies support unstructured data. Hadoop, for example uses HBase database and supports structured data and SAP HANA supports both unstructured and structured data. These databases are termed NoSQL (not only SQL) databases were created when RDBMS limitation where exposed when segmentation was driving vendors to support distributed hardware environments.

RDBMS are far from finished and will continue to compose the majority of where data is stored, however where RDBMS technology reaches its limits tightly coupled MPP database and enterprise data warehouse technology provides low latency for database for simple queries to about 100TB in size.

Determining the use cases that are to be supported will help drive the decision making on what databases are needed, but it is likely to be a complex hybrid environment supporting different technologies. Established vendors, such as Teradata, continue to provide CSPs with guidance and support in adopting new technologies, with an ability to support implementations to maintain the very high levels of reliability needed by CSPs.

Analytics and presentation

Analytics tools such as Tibco Spotfire, Tableau, IBM SPSS, SAP Business Objects, HP Autonomy, Oracle Microstrategies and others provide the tools to view data sources, create models and provide visualisation of the information. These tools use the underlying data sources accessed through real-time and batch data processing using interfaces to ODBC/ JDBC connectors to established systems and through the appropriate query interface to other the underlying systems.

The selection of analytics tools and visualisation tools needs to be able to work with the underlying infrastructure, beyond this other considerations may include the availability of resources to support the tool and do any of the systems provide expertise to support the required use cases, either as part of the software or within professional services.

COMPANY PROFILES

Guavus

Company summary

Guavus is a private company that was founded in 2006 by CEO Anukool Lakhina. The company's headquarters are in San Mateo, California with offices in the UK, Singapore, India and Canada. The company has built its reputation around its ability to provide near-real-time big data analytics applications for the telecoms sector. The company employs 400+ staff and has raised $87 million in equity funding. In January 2013, the company announced that they had acquired Neuralitic Systems, a provider of mobile data monetisation and marketing analytics. The company's big data solutions have been deployed at two of the top three mobile carriers in the USA, and three of the top five IP/MPLS US backbone carriers.

Big data analytics credentials

Guavus was founded to address big data analytics through an integrated software suite that delivers timely insights into business processes. Critically the company's patent-pending Reflex platform processes data as it receives it, not waiting for it to be stored and subsequently queried, slowing the process. This ability drives new business benefits to current processes and enables the creation of the new ones. The platform integrates with a number of Guavas applications that address different aspects of the CSP including:

- Network Operations: Network planning and optimisation intelligence for capacity planning, network peering optimisation and traffic engineering
- Service usage and analysis (that looks at over the top applications usage, product engagement across service types and application usage)
- Customer care (self-care portal, churn detection)
- Marketing: multi-dimensional customer segmentation, and targeting based on information from the network, device, content, subscriber and location
- Monetisation: profiling and contextual advertising for advertising networks

Key differentiation

Guavus provides complete big data solutions within the telecoms market that are based on its streaming analytics technology to apply solutions in near-real-time to solve business issues for CSPs. Guvaus's complete end-to-end approach provides CSPs with operational solutions, by providing software and professional services and hardware based solutions that are as reliable as CSP core networks. Its current size and telecoms focus helps provide an agile approach that enable customers to adopt solutions faster and at a lower cost.

Competitive pressures

Guavus is a focused vendor within the telecoms market, but it will increasingly run into competitors who are either: specialists within telecoms market that are rapidly adopting analytics tools to support their current product propositions, or generalist analytics companies that are able to bring skills from outside of the telecoms sector. Guavus' partnering strategy – as with its recent announcement with Teradata – will be important in maintaining growth in the mid and longer term.

Subex

Company summary

Subex is a provider of business support systems (BSS), based in India. The company was founded in 1992 as a telecoms hardware integrator and then changed direction in 1999 to become a fully-fledged telecoms software vendor. Its key solutions include revenue assurance, fraud management, partner interconnect and data integrity management.
Subex has offices in Australia, Dubai, India, Singapore, UK and USA and employs around 1,000 people. Subex has more than 300 installations of its products in 70 countries including at some tier one CSPs from developed North American and European markets. It has also partnered with several system integrators such as IBM, Infosys, Ericsson and Tata Consultancy Services besides technology partners such as Cisco, Hauwei, Oracle and QlikTech International.

Of late, Subex has shifted its focus towards a managed services revenue model rather than a software licensing model. Typical managed services contracts run for two to three years and bring in more predictable revenue.

Big data analytics credentials

Subex has a growing capability in analytics specific to CSPs, building on its core competencies that are based on a deep understanding of data found within CSPs' capabilities of working with large data sets and the development of the tools to provide modelling to deliver key insights into data. In a number of ways Subex has been offering specialist analytics solutions on its core Subex ROC portfolio of products that include ROCware since it was founded. These provide solutions that include: capacity management, data integrity management, propensity profiling and offer performance management. With the product portfolio and skills, it is well placed in the telecoms market to provide support for data analysis on related issues and offer innovative solutions.

As part of this move into new analytics use cases Subex has recently introduced ROC Asset Assurance to help CSPs track and manage their assets and reduce capital expenditure (CAPEX). The analytics solution monitors and optimises capital expenses throughout the asset lifecycle. It provides insights that can be used to enhance current business processes that control capex on network assets. The solution also tracks data quality indicators to improve the accuracy of data to ensure better capital decisions, using the network itself where possible.

Key differentiation

Subex has a significant customer base with a deep understanding of the telecoms data, its product set provides a set of tested tools that can be used as a basis to provide greater functionality with its current customers and approach new prospects.

Competitive pressures

Subex is a specialist vendor in the telecoms market within the fraud and revenue management space and will need to quickly establish itself in a wider market before more generalist vendors are able to provide solutions into its customer base, a move that the new ROC Asset Assurance offering will help drive.

Tibco

Company summary

Tibco Software is a public company that provides software on-premise or through its cloud services. Tibco provides solutions that capture data, and enable companies to act on it, which can include pre-empting future outcomes. Tibco has 4,000 customers worldwide to manage information across multiple industries.

In 2007 Tibco acquired Spotfire which is now run as a Tibco division. Its products offer insights through data visualisation and discovery tools. Spotfire customers include Global 2,000 companies and include telecoms customers such as AT&T, British Telecom, KPN, Portugal Telecom and Telia-Sonera.
The Tibco big data solution includes both Tibco infrastructure solutions and the Spotfire analytics product sets which work together to help organisations manage, analyse and act upon insights in large volumes of complex data.

Big data analytics credentials

Tibco's pedigree in working with large data volumes has continued with its various acquisitions including Spotfire. The ability to access transient and static data in real-time and perform analysis on it provides Tibco with a strong play within the market. Although Tibco was adopted initially by many companies in the financial markets, it was widely adopted as the data messaging bus for integrations in many telecoms operators. This heritage provides ready access to many of the static data sources, which can be supplemented with other data sources that include transient data such as web or location, from within the Spotfire platform. Insights that are found within the data can be applied to business processes in real-time through Tibco's complex event processing solution. This end-to-end data acquisition, analysis and action provide a capability only a few other vendors are able to achieve in their own product portfolios.

Typically big data analytics is used within marketing and finance but is also used within operations such as network capacity planning. Three areas where Spotfire has deeper knowledge are:

- **Operational effectiveness** – for network engineering and operations and it including capacity planning and forecasting based on network patterns.
- **Sales and Marketing** – ability to segment customer base and impact customer churn.
- **Digital advertising** – to provide contextual based marketing offers.

Key differentiation

The combination of Tibco infrastructure products and the Spotfire analytics platform provides an integrated data acquisition and analysis solution from a single vendor that can deliver automated actions in real-time based on business rules. The cross industry nature of the analytics platform ensures that there is a large user base that can help organisations using Spotfire with examples and implementations from both the telecoms and other industry sectors. A CSP who is interested in creating a centralised function for big data analytics can

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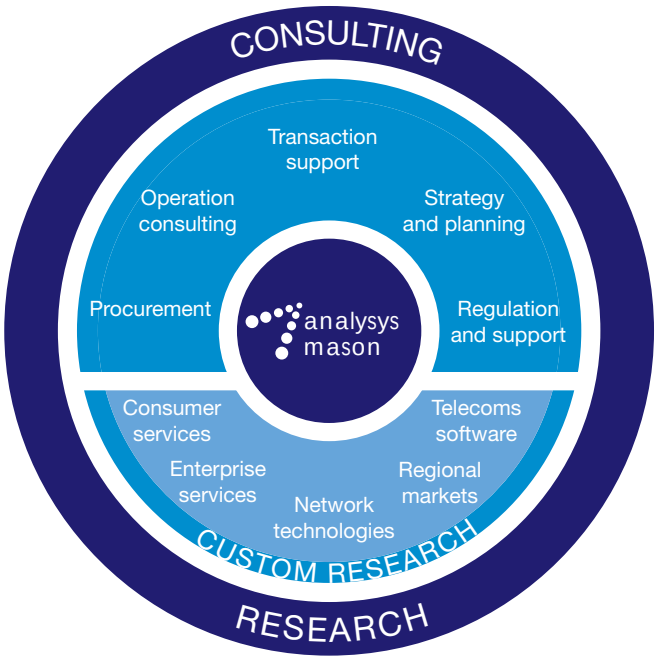

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