

Evolving through analytics-driven insight

How analytics is helping telecommunications companies drive next-generation revenues



Introduction

As traditional revenue streams such as voice and SMS continue to decline in favour of mobile data services, telecom companies in the UK face a significant challenge from over-the-top (OTT) service providers.

The danger of becoming a “dumb pipe” – a low-margin, commodity data platform that OTT providers exploit to deliver new and profitable services – is a major concern for most telecom companies. OTT providers are not only taking the lion’s share of new revenue opportunities, such as advertising revenue from social networking, web searches and music and video on demand; they are also eating into traditional voice and SMS market share with Voice over IP (VoIP), videoconferencing and instant messaging services.

In their struggle to resist and overcome the threat posed by OTT rivals, telecom providers have a number of significant potential advantages. First, they already have a financial relationship with many millions of consumers and businesses: their customers accept that they will be billed on a monthly or pay-as-you-go basis for the services provided. By contrast, many OTT providers start out as free services, and face significant challenges in converting casual users into paying customers.

Second, as a by-product of running their mobile networks, telecom providers collect a huge amount of data about their customers. For example, in order to route a phone call to a mobile phone, the network needs to know the location of the phone, which means that telecom providers gather data on where their customers’ phones are at all times. Equally, in order to serve web pages or apps to a smartphone, the telecom provider needs to know what data needs to be sent to which devices, which opens up the possibility of monitoring customers’ data usage preferences.

Of course, privacy and data protection concerns have a huge impact on how telecom providers are able to utilise this data – but the crucial point is that the data is already passing through

their networks. By contrast, most OTT providers have to convince users to actively share data, as well as gain the appropriate permissions to use it.

In considering next-generation revenue opportunities, telecom providers need to make full use of these two advantages and use them to beat the OTT providers at their own game. In particular, they need to exploit the data they collect: by analysing this data, they will be able to develop innovative, personalised services that deliver new value to customers, and build alliances with advertisers, retailers, and even entire cities to create new revenue streams. By persuading customers to opt in to these new services, telecom providers will be able to transform their role in the communications ecosystem – whether that means becoming a “smart pipe” that delivers greater profitability and more value to customers, or reinventing themselves as “Telco 2.0” providers that offer branded services in a wide range of new sectors.

Ultimately, telecom providers should be able to create a virtuous circle: new, customer-focused services will encourage users to opt in and share their data; and in turn, the data will be used to design a further generation of services that are even more attractive to customers. To kick-start this cycle, providers need to be able to gain a better understanding of the customer experience and the kinds of services that users will actually want.

In many cases this will mean gathering data from across a globally integrated enterprise – one that is capable of using the underlying mobile network as a tool to enhance the overall customer experience. Once this is achieved, it should be possible to combine retrospective data, real-time events and predictive models in order not only to present the right offers to the right customers at the right time, but even to tweak those offers for each customer and each situation. Analytics is the key to gaining this deep level of insight, and is therefore crucial to the successful transformation of the telecommunications industry.

The importance of analytics

While the vast quantities of data that flow through mobile networks offer a potential advantage for telecom providers, the value of this data can only be unlocked through analytics.

Most telecom providers are already fairly mature in their use of “traditional” analytics – for example, customer segmentation and propensity modelling based on the analysis of network events combined with CRM and ERP data. Product development teams can use the insight from such analytics to identify opportunities to refine existing services and develop new ones; marketing teams can use it to segment customers and provide more personalised offerings; and infrastructure teams can monitor network usage and ensure that the underlying systems are able to support the required service levels.

Above all, these traditional approaches already provide a basis for tailoring the customer experience to the needs of different types of customers, and optimising revenue generation as a result. For example, by using financial information and mobile usage data to segment “VIP” customers, a telecom provider’s customer service and marketing teams can plan more effective strategies for maintaining the loyalty of their most valued and profitable subscribers.

However, the next generation of telecommunications services and products will need to go much further, and will therefore require a new approach to analytics. To take this next step,

providers need to be able to integrate more types of data from more sources at a much higher speed and on a far greater scale. Instead of retrospectively analysing what usage a customer made of their network over the past month, providers will need to know what their customers are doing now, where they are doing it, why they are doing it, and whether their behaviour follows any patterns over time.

Customer	Device	Network
Web history, calls, video streaming, downloads, social media interactions and data collected from smartphone apps	GPS location data, and data from other inbuilt smartphone sensors. Data from multiple devices (smartphones, tablets etc.)	Network event data for voice, SMS and GPRS services, as well as near-field contact (NFC) transactions and Wifi hotspot usage
<i>What</i> are they doing?	<i>Where</i> are they doing it?	<i>When</i> and <i>how often</i> do they do it?
<p><i>Why</i> are they doing it? <i>How</i> can we help them? <i>How</i> can we turn this into a revenue stream?</p>		

The combination of these new dimensions of data turns analytics into a more complex challenge – involving both Big Data and real-time analytics and decision-making.

Big Data analytics

Tracking customers' activity, location and network usage requires the collection and analysis of thousands of individual data-points per customer per day. The need to perform this kind of analysis across a customer base of several million is forcing telecom providers to confront the challenges posed by Big Data analytics.

The complexities of Big Data analytics are not simply a result of the volume of data being much larger, or the fact that much of it may arrive in an unstructured form. The real difference is that the quantity of useful information contained within the data may be very much lower than in traditional analytical data-sets. Systems that are working with Big Data need to be able to identify the needle in the haystack as quickly as possible, and deal with the remaining hay in an intelligent manner.

Next-generation telecom services require IT architectures and software that can quickly gather, load and analyse huge quantities of data, and then store, archive or discard it appropriately and cost-effectively. Such systems are key enablers for the development and deployment of next-generation services.

Real-time analytics and decision management

The second main difference between traditional approaches to analytics and the requirements of next-generation services is that data needs to be analysed while it is "in motion". Instead of working with a stable set of historical data "at rest", telecom providers will need to find ways to deal with a constant influx of ever-changing information, and use it to make decisions in real time.

For example, a telecom provider might want to create a service that utilises GPS data from a customer's smartphone to provide information or commercial offers that are relevant to the customer's current location. It could even build a solution that predicts their future location by analysing the route they are travelling and comparing it with their past habits. This might also enable the provider to draw useful conclusions about the purpose of the customer's journey.

For example, if it is 8:30 a.m. on a weekday and the customer is following a route that they regularly use on weekday mornings, it is likely that they are going to work. If this is the case, it is probably not worthwhile to send them promotions from nearby shops and restaurants. By contrast, if they are travelling towards a shopping centre on a Saturday, it will probably be much more appropriate to send them offers for the local stores.

The success of location-based services depends on the provider's ability to process location data in real time and react instantly. This kind of insight is only valuable within a specific time window: as soon as the customer leaves the area, the delivery of localised content loses most of its value. As a result, telecom providers need to find solutions that can spot predefined patterns in streams of incoming data, feed them into sophisticated decision-making algorithms, and trigger events on the network without any delay or need for human intervention.

Exploring the possibilities

Smarter Commerce: location-based advertising

Imagine this: as a consumer drives towards a local shopping centre, they receive an advertising message encouraging them to visit a certain store. As they walk along the high street and approach the store, they receive a promotional voucher to their mobile wallet, inviting them to enter. The voucher is personalised by analysing the consumer's preferences and recent purchasing behaviour, using a statistical model to determine which items in the store best match their profile. Both the initial message and the voucher have been triggered by real-time analysis of their location, combined with automated decision management technologies.

If the consumer decides to take advantage of the offer, they can use their phone to pay for the item via contactless near-field communication (NFC), and the voucher will be automatically redeemed. The completed transaction itself can then be logged and fed back into the purchasing behaviour model, to provide an even more accurate view of the consumer's preferences.

Alternatively, the consumer might be attending a music festival. Each stage is geo-fenced, so by analysing the time the consumer spends at each stage and cross-referencing this data with the festival's timetable, it is possible to discover which artists they are watching. If the telecom provider can perform this analysis in real-time, it can serve appropriate promotional offers from music publishers to consumers while they are at the festival – for example, encouraging them to download the latest album of the artist they have just listened to.

These types of solutions utilise real-time decision-making technologies to handle the vast streams of geo-location data and make on-the-fly decisions about which offers to send to which consumers. In the high street example, real-time technologies are combined with more traditional at-rest analytics: the complex statistical models of customer preferences may be refreshed on a weekly or monthly basis, but the results are used to fuel the real-time decision-making process.

UK telecom providers are already taking the first steps in the creation of personalised mobile advertising delivery services, with O2 Priority Moments as a leading example. The “Weve” digital wallet scheme – a UK joint venture between Vodafone, O2 and Everything Everywhere, formerly known as “Project Oscar” – also promises to lead to exciting innovations in this area, driving the ability to deliver complex, multi-wave, cross-channel marketing initiatives that guide consumers from the initial offer through to the completion of the transaction, and onwards to further opportunities for up- and cross-selling.¹

Smarter Cities: traffic and crowd management

Many global cities are currently investigating ways to improve urban planning and public services by making better use of data.

Cities like Rio de Janeiro are already building centralised operations centres to improve the way they coordinate public services to address issues such as traffic management, crowd management for large-scale public events, and emergency services response to extreme weather conditions. The success of such centres depends on their ability to gather and interpret information – whether it comes from weather satellites, traffic lighting systems, public transport vehicles, closed-circuit cameras, or other sources – and use it to make smarter decisions.

Increasingly, machine-to-machine (M2M) communications will provide a vital data-feed for such communications centres. Cities are well aware of the benefits of creating an “internet of things” – a complex network of embedded sensors and actuators that can help public services respond more effectively to citizens’ needs. However, building and maintaining such a network is potentially a hugely complex and expensive task.

This provides a great opportunity for telecom providers, because the mobile phones that citizens carry with them as they walk or drive around the city are a valuable untapped resource. Modern smartphones contain a variety of sophisticated sensors, including electronic compasses, accelerometers and GPS locators. Giving cities access to the information generated by these sensors – properly anonymised and aggregated, and used with the customers’ consent – would unlock a world of possibilities.

For example, a city could analyse road traffic and pedestrian footfall patterns in different areas and use the results to optimise public transport systems, or redesign road infrastructure to eliminate bottlenecks. Using real-time decision-making technologies, it could also dynamically alter traffic light patterns and other transport control systems to

alleviate congestion by routing drivers along different roads when a traffic jam occurs in one area; or to increase bus and train services when a large crowd has formed at a particular station. It would even be possible to provide live, personalised traffic updates to customers themselves, advising them to avoid certain roads and suggesting alternative routes to their destinations.

Telefónica’s Dynamic Insights division, a global business unit that focuses on creating value from Big Data analytics, is already making progress in this area. In partnership with several retail companies, it is developing a product known as “Smart Steps”, which helps retailers analyse pedestrian footfall and make better choices about the location and format of new stores. In the future, there is also potential for Smart Steps to help city councils measure changes in footfall due to the introduction of free parking, late-night shopping or street markets.²

These kinds of partnerships with local government organisations are likely to provide a significant revenue stream for any telecom provider with the skills and infrastructure to deliver the data and analytics services required. From a city’s point of view, the business case for entering into such partnerships is clear: they can deliver enormous savings in operational costs for public services and a clear return on investment.

For example, IBM has been working with the city of Stockholm, using streaming analytics technologies to monitor traffic flows in real time and send information on routes and travel times to citizens’ mobile phones.³ These kinds of projects demonstrate an appetite for analytics services that telecom providers are in a prime position to satisfy.

Smarter Telecommunications: growing customer loyalty

Telecom providers can also utilise analytics to make the most out of the financial relationship they have with their existing customers by offering more sophisticated, personalised tariffs and offers. Instead of simply renegotiating contracts every 12 to 18 months, providers could offer dynamic packages that adapt to customers' usage patterns, or that trigger regular promotions and special offers based on customer behaviour.

For example, if a customer's mobile data usage shows that they have recently joined a new social networking site and are spending a lot of time and data on it, the provider could send them an offer of free or reduced-cost data for that particular site. Using analytics to enable more detailed itemised billing could allow telecom providers to price different types of data usage in different ways, enabling strategic partnerships with OTT providers.

Most importantly, by presenting customers with the opportunity to create a personalised billing relationship that suits the way they use their phones – rather than lumping them into a broad general bundle that does not meet their specific needs – providers should be able to increase customer loyalty and retention, while also designing targeted offers that promote usage and increase overall revenues.

Moreover, because the relationship is constantly evolving, it should bring the customer and the provider closer together. Currently, many customers only speak to their provider when it is time to renegotiate their contract; in the future, there could be an ongoing dialogue of offers from the provider and responses from the customer.

This would help to build a trusted relationship based on the values of the customer, which would make it easier for customers to feel safe in sharing their personal data and take advantage of new services. Again, this would lead to the virtuous circle: by persuading customers to share their data, the provider can develop better services, which in turn attract other customers and gather even more data.

Main challenges of monetising data

Technical challenges

Compared to most OTT providers, which typically start life as web-based software development companies, telecom providers tend to suffer a number of disadvantages in terms of business agility. Their IT infrastructures – designed for large-scale network management, and often fragmented by acquisitions and the demands of organic growth – tend to be complex and inflexible, making it more of a challenge to collect, standardise and prepare data for analysis.

Although their large customer-bases and extensive reach may be a commercial advantage, the scale of their operations makes it difficult to “start small” and develop new services over time. Rolling out a new analytics-based service to several million paying customers is inevitably a more difficult process than making it available to a few thousand casual users.

On a similar point, there are challenges around the sheer quantities of data involved. Providers are highly experienced in managing huge volumes of data on an operational basis, but analytics – and particularly real-time analytics – poses a different set of problems. In addition to traditional “at-rest” analytics, these new services will require the analysis of Big Data in a real-time manner to support instant, automated decision-making.

Combining structured and unstructured information from internal systems (on voice and data usage patterns, on geo-location, on customers’ preferences and privacy settings and so on) and external sources (for example, Twitter feeds, Facebook pages, web forum posts and so on) requires new system landscapes capable of gathering huge volumes of data and analysing it in real time and at the right total cost of ownership.

Privacy and data protection challenges

The nature of many of the next-generation services that this paper has outlined raises questions over privacy and data protection. Although much of the data required to create these new services is already collected by telecom providers in the UK as part of day-to-day network management, they generally face strict legal restrictions on how this data can be utilised. To meet the requirements of data protection standards and other legislation, providers not only need to impose appropriate data governance frameworks internally – they must also be able to produce reports that demonstrate compliance to external regulators.

Even more important is the issue of trust. As a consequence of their long-term financial relationships with most of their customers, telecom providers have a key advantage over newer internet-based businesses in terms of the level of trust that customers are willing to place in them. However, this advantage could easily be jeopardised if providers are too aggressive in their approach to customer privacy. The line between an unbeatable new product, service or offer and an unacceptable intrusion into customers’ lives is potentially a thin one. There is a real risk of customers defecting from one provider to another if they are unhappy with the way their privacy has been handled.

For this reason, it is necessary to encourage customers to “opt in” and give permission for their personal data to be analysed. Any new service that requires the analysis of customer data will need to include a sophisticated permissions management framework that gives customers the ability to select and update their privacy preferences. In many cases, this will need to work on several different levels: for example, a customer might agree to receive adverts and special offers from certain retailers, but not from others – so the permissions system will need to be able to track not only whether the customer wants to use the service, but also which third parties can be involved.

It may also be desirable to enable customers to switch individual permissions or groups of permissions on and off in real time. For example, they might choose to turn off local advertising offers while they are at work, and turn them on again in the evenings and at weekends. This level of sophistication in permissions management could prove to be both an enabler and a differentiator for future revenue streams, because it gives the customer a feeling of control over the information and offers that they receive.

While technology can act as a key enabler, the issues around privacy cannot be solved simply by implementing a new IT system. Success requires the combination of a set of legal, information governance, analytics governance and technology services to ensure that all the complexities are properly addressed. Above all, telecom providers need to understand how to communicate with customers about permissions management – helping them understand what data is required, why it is required, and what the benefits will be if they allow it to be analysed. This will give them the opportunity to make informed decisions and take responsibility for their own privacy choices.

Organisational challenges

Staffing and expertise

Gaining the capability for Big Data and real-time analytics requires the adoption of leading-edge technologies, and a new breed of “data scientists” to exploit them. Data scientists are not only responsible for data management, analytical methods and delivery mechanisms, but also for providing a creative input into new services by pushing the boundaries of what analytics can do for the business and its customers. Their role encompasses the whole lifecycle of analytics – from the data itself through the analysis process to the actions taken and the subsequent results. Their ability to communicate with the organisation and “tell the story of the data” is also key.

Finding the right staff to step into this type of role will be a key challenge; within the telecommunications industry, data science is in its infancy, and resources may need to be brought in from outside. While most telecom providers already employ insight analysts to support specific areas such as customer segmentation, these analysts may not have the broader expertise in mathematical modelling, statistical analysis and mathematical optimisation required in true data science roles.

In other industries – particularly in central government, the military and the transport and logistics sector – these skills are more common. Operational researchers from these fields, who often focus on the development of mathematical models that simulate, analyse and optimise complex systems, make ideal data scientists. In the medium term, recruiting experienced operational researchers from these sectors may be the best strategy until telecommunications data science reaches a greater level of maturity.

Organisational structure

In many cases, the new business opportunities offered by next-generation data-driven services will involve the creation of entirely new business models that need to operate in parallel with the telecom providers' traditional network-focused operational model.

The best way to achieve this may be to set up new, independent business units to oversee each of the different types of service. For example, if a telecom provider decides to launch a mobile advertising platform, its clients will typically be retailers and manufacturers of consumer products and services. Effectively, the telecom provider will offer these clients the same service and the same value chain as a traditional advertising agency, and will probably use the same kind of revenue model – being hired on a per-campaign basis. In this case, it would make sense for the telecom provider to set up a new business unit that will manage all the advertising projects and act as a front office that interfaces with the clients. The front office, which should mainly be staffed by advertising professionals, will then work with a back office team composed of traditional telecoms specialists to deliver the advertising campaigns via the company's networks.

Managing areas of the business that are staffed by data scientists can also pose a challenge to traditional telecom providers, whose management structures typically focus on channelling resources to meet specific business needs. For data scientists to flourish within an organisation and deliver their full value to it, they need to be given the time and space to experiment and innovate. This will enable them not only to solve the problems posed to them by the business, but also to identify new opportunities that the business may not have even imagined. To help managers get the best out of these expert resources, a different management style and a different method of setting goals may be required. If this cultural and organisational challenge is not taken seriously enough, the risk of employee turnover will be high.

How IBM can help

IBM's approach to the challenge of next-generation revenue generation in the telecom industry encapsulates a best-in-class, end-to-end capability. As this paper has suggested, the monetisation of telecom providers' data is much more than simply a technical challenge around Big Data – it is a business challenge that must be addressed at senior executive level.

For the Chief Information Officer, the issue may be to find the right platforms and put the appropriate information governance structures in place. For the Chief Marketing Officer, it's about building relationships and partnering with different industries to sell new services. For the Head of HR, it involves recruiting data scientists and creating a culture in which they can flourish. And for the Chief Financial Officer and Chief Executive, overseeing such a fundamental change in the way the company operates and generates revenue will be an enormous challenge.

Through its comprehensive range of service offerings and technology solutions, IBM can help its clients develop a next-generation capability that enables them to answer all the key questions: How can we obtain, store and process the data? How can we use analytics to make the data valuable for our business, our partners and our customers? Once we've developed a new service, how do we take it to market? How do we persuade customers to opt in? How do we manage it operationally? And how can we create a culture that turns this kind of innovation into part of our everyday operations?

Q: How do we decide on the best way forward?

A: IBM can guide your analytics strategy

The first step in making next-generation revenues a reality is to gain a full understanding of how the business currently operates, how it needs to change, and what the impact of those changes will be. With decades of experience of working with the telecommunications industry and its potential partners in other sectors, and expertise in all the technologies that will underpin these next-generation services, IBM® Global Business Services® is ideally positioned to advise on these issues.

IBM can help telecom providers define a compelling business case and a realistic roadmap for analytics. In addition to advice about software and platforms, IBM is able to address issues related to people (such as organisational change, roles and responsibilities, cultural change, recruitment and retention) and processes (such as information governance, privacy and permissions management).

Among other important considerations, IBM can advise on the formation of an "Information Council" – a body specifically tasked with governing information from the perspective of the needs of the business. The council should sit just below board level, and should be made up of senior executives who are responsible for steering the whole organisation through this period of radical business change.

Q: How can we build our next-generation capability?

A: IBM can help you with solution development

Once the roadmap has been agreed and executive sponsorship has been obtained, IBM can support the development of the next-generation capability itself, in both its technical and business aspects.

For organisations that initially lack specialist individuals such as data scientists, IBM can provide the right people both to fulfil the role in the short term, and to act as mentors for the internal team in the longer term. The Advanced Analytics & Optimisation (AAO) Group within IBM Global Business Services has a 25-year heritage of applying logical thinking, innovative data analysis and strategic modelling to solve complex business issues. AAO specialists from IBM can be a valuable resource for any telecommunications organisation that is looking to develop its data science capabilities.

For process-related issues, IBM can provide consultancy based on years of analytics and information management experience. Take information governance as an example: the IBM Information Governance Council was established in 2005, and has pioneered thought leadership around information governance and continuous process improvement ever since. IBM was also a founder member of the Information Governance Community (www.infogovcommunity.com), which brings together IBMers, customers, partners and analysts from around the globe.

Finally, for technology-related issues, IBM has the expertise to help companies implement analytics platforms, information management software and infrastructure – regardless of whether these technologies are supplied by IBM, other companies, or a mixture of the two.

Q: What if we don't want to create an in-house analytics capability?

A: IBM can provide “Insight as a Service”.

For telecom providers that want to focus on the strategic aspects of next-generation revenue creation, rather than building a data science capability within their own organisation, IBM can provide analytical insight as a service.

IBM analysts can provide an end-to-end service, from data discovery and modelling through to analysis and results. This can be delivered either as a defined consulting engagement for one-off research projects, or as an ongoing service that is fully outsourced and delivered either by on-shore or off-shore resources.

Q: What if we don't want to have to manage a new set of systems?

A: IBM can deliver managed services for analytics.

For companies that want to keep their analytics capability in-house, but would rather not maintain and support the underlying technology, IBM can offer a managed services approach. In this case, IBM can manage, maintain and support all the necessary systems for its clients. IBM can also provide hosting services for analytics systems and data, either on specific servers or in the cloud.

Q: What if we want to do something that's never been done before?

A: Working with IBM Research can help you break new ground.

In many cases, the next-generation services that telecom providers are envisioning will involve the use of leading-edge technologies on a scale never tested before. For these first-of-a-kind projects, collaboration with IBM Research can offer significant advantages.

IBM invests approximately \$6 billion per year in research and development, and its strategy of helping organisations around the world to build a Smarter Planet® has led to a significant focus on the power and potential of analytics technologies.

IBM Labs in Israel and India are currently researching Big Data analytics, modelling customer behaviour, social media and text mining. At IBM's Smarter Cities® Labs, teams of data scientists are already working with local government and telecom providers to develop real-world pilot projects around traffic management and other services. Meanwhile, pioneering work by IBM at events such as Wimbledon is pushing the boundaries of mobile-based augmented reality and showing how real-time decision-based content delivery is becoming a reality. All of these projects potentially have enormous implications for the future of telecommunications – and by partnering with IBM Research, forward-thinking telecom providers have the opportunity to secure a significant advantage over their slower-moving competitors.

Q: What technologies do we need to build next-generation services?

A: IBM can provide everything you need.

From the analytical tools through the underlying information management software to the hardware infrastructure, IBM has the technology to meet both current and next-generation requirements.

IBM technologies for next-generation analytics in the telecommunications sector

- **Reports, dashboards and scorecards:** IBM Cognos® Business Intelligence provides an ideal solution for the analysis of current and historical business data, giving telecom providers the information they need to monitor business performance and make better decisions.
 - **Predictive analytics and decision management:** IBM SPSS® software enables telecom providers to mine both structured and unstructured data in order to create the predictive models and decision-making algorithms that will underpin many next-generation services.
 - **Customer experience analysis:** Tealeaf software enables companies to monitor their customers as they use a mobile app or website, and optimise the customer journey by analysing user experience at every stage. Meanwhile, IBM Coremetrics® provides detailed web analytics to support marketing teams.
 - **Marketing campaign management and automation:** IBM Enterprise Marketing Management software provides a sophisticated engine for orchestrating complex, multi-wave, multi-channel campaigns. Data on consumer behaviour can be used to trigger events and deliver marketing offers automatically and in real time.
 - **Enterprise data warehousing:** The IBM InfoSphere® software portfolio supports all the core processes required for data warehousing, including ETL (extract, transform and load) processes and sophisticated information governance tools that can track data all the way from its source.
 - **Real-time messaging and integration:** IBM WebSphere® software can provide a reliable, high-performance messaging infrastructure that enables numerous systems to communicate seamlessly – which makes it ideal for bridging the gap between telecom providers' existing systems and the new analytics and enterprise marketing management systems that will form the core of next-generation services.
 - **Big Data analytics:** IBM InfoSphere BigInsights™ is an analytical platform designed specifically for Big Data applications. Built around the open source Apache Hadoop platform, which has quickly become one of the leading technologies in the Big Data space, it uses cluster-based processing to massively accelerate large-scale analytics. InfoSphere BigInsights enables rapid analysis of unstructured data – for example, text from millions of Twitter updates – and includes IBM BigSheets, a spreadsheet-like interface that allows data scientists and business users to explore BigInsights collections and discover new insights without the need to write any code.
 - **Streaming analytics:** IBM InfoSphere Streams enables continuous analysis of massive volumes of data – in the region of petabytes of data per day – with sub-millisecond latencies. This provides an ideal platform for real-time decision-making: monitoring customer behaviour and triggering events based on the customer's location and other conditions.
 - **Real-time advertising:** IBM solidDB® is a fully-featured, relational, in-memory database that delivers extreme speed and availability for the kinds of real-time applications that next-generation telecom services will require – such as delivering advertising content in real time.
 - **Rapid analytical processing:** The IBM PureData™ System is an expert integrated system that is optimised for analytics and operational decision-making. It simplifies and optimises the performance of analytic applications, enabling complex algorithmic processing tasks to run between 10 and 100 times faster than a traditional custom system.⁴ Its modular design means that telecom providers can scale their systems to an almost unlimited extent – making the creation of next-generation services for millions of customers into a practical possibility.
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Taking the next steps

To learn more about how IBM can help telecom providers create next-generation services with analytics, please visit ibm.com/software/analytics/telecommunications

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