Enterprise Data Center Services and the Market Opportunity for Mobile Service Providers

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Executive Summary

- Many enterprises are in the process of struggling with the large influx of mobile, data-hungry devices (the smartphone & tablet problem), how to best leverage mobility to make their workers more efficient and more effective, and how to evolve their own computing and data infrastructure given advances in network function virtualization (NFV).

- Mobile operators can play a key role as a managed service partner for the enterprises. By providing a family of enterprise mobility and data center services, they can tap a massive potential market for services. Enterprises will benefit by selectively outsourcing traditional back-office and IT functions that are increasingly commoditized, and more efficiently delivered by an operator with a large data center and data delivery network.

- In offering enterprise data center and cloud services, mobile network operators can leverage their radio access and device-level information, and network scale, and should not avoid competing for data center and infrastructure-as-a-service (IaaS) business. This business is highly complementary to other enterprise efforts currently being pursued by mobile operators, especially machine-to-machine (M2M), and offers a very large and fast growing, incremental revenue opportunity.

- Many cloud-based or data center services being offered today require enterprises to take on the role of system integrator, which for many is a financial and logistical burden. Mobile network operators can take this burden off of enterprises, and simultaneously add value (and revenue) through the packaging and operationalizing of common infrastructure services. Examples include: hosted unified communications, mobile device management, location-based services, and regulatory or compliance services.

- The sum is greater than the individual parts. For resource constrained enterprises in the mid-market, prepackaged common infrastructure service offerings (with all the necessary integration, support, and operations behind them) are transformative to enterprise IT. Mobile operators have the ability to liberate in-house IT operations from commodity work, and allow them to focus resources on technology practices that create competitive advantage in the market for their business.
The Data Center Opportunity for Mobile Operators

In addition to the data center virtualization changing the economics of computing and underpinning cloud computing, the communications industry is at the cusp of an important architectural shift, namely Network Function Virtualization (NFV) whereby many network nodes, will increasingly be virtualized. Signaling or control-plane network functions, which are very compute-intensive, can be moved into a virtualized data center either in an operator’s network, or in a public or private cloud network. Data-plane network functions can also be gradually moved to a virtualized environment with the exception of nodes like core routers, which are highly optimized for a specific purpose.

The move to NFV offers operators several advantages like cost savings, scale and efficiency with regard to their networks. Deploying common, off-the-shelf (COTS) server hardware and virtualization software is potentially less expensive than purchasing dedicated hardware for each network node or function. System capacity can also be scaled up or down almost instantly depending on demand. Redundancy and high-availability features are often inherent in the data center infrastructure, and would not have to be duplicated, as is the case in many network functions today. While we are at the very early stages of IT and data center technology spreading to operator core networks, we believe that this architectural transition is generational and will happen gradually over the next decade.

Since mobile network operators will be investing in virtualized data centers, they should be planning for hybrid configurations that easily and securely connect private enterprise data centers to their data centers. This enables leverage of both the data center investment, and network capacity to begin to offer their enterprise customers’ data center services on top of the wireless and hosted communications services that they currently provide. The enterprise data center opportunity is too large, and too strategic of a market for mobile operators to ignore.
The Use of Cloud Services Offer Tremendous Advantages for Enterprises

Key benefits for enterprises to migrate from capital-intensive, premises-based data centers to cloud computing include:

- No upfront investment
- Low on-going operational costs
- Flexible and elastic capacity
- Greater speed to increase or decrease network capacity
- Ability to focus on business issues, not on back-office operations and processes

Current cloud service providers report that enterprises can experience tremendous cost savings when moving their computing and applications to hosted cloud services. Amazon Web Services (AWS) reports that enterprises can experience a 70% cost savings when porting an Oracle database to their service. Moreover, also according to AWS, total cost of ownership savings by using a public cloud may be as high as 60% compared to a traditional enterprise data center.

Some of the key economic benefits to AWS cloud services and other cloud operators are below:

- No start-up costs. No upfront costs and long-term commitments mean that enterprises can access cutting-edge computing infrastructure, and services with little-to-no investment. In contrast, building an on-premises data center and communications infrastructure is often slow and expensive. Often, expensive hardware needs to be purchased, installed and configured, and applications need to be designed, written and tested, which can take months, delaying the time-to-market of key initiatives and projects.
- Economies of Scale. Cloud operators, since they serve many customers, experience tremendous economies of scale compared to ‘single-customer’ private enterprise data centers. These economies of scale provide cost efficiencies through a combination of high-volume, low cost procurement plus innovations in the design of data centers, servers, storage and network, which drive new efficiencies and higher reliability. AWS, as a result, has been able to lower prices 31 times since its inception in 2007.
- Flexible capacity and pricing. There are different types of workloads that organizations and data centers need to handle, and they can change over time. Some workloads have stable usage patterns, like business applications with a consistent number of users and data, or established websites. Other workloads can be entirely unpredictable, like a new product website, or a social game. And some workloads can experience “spiky” loads that vary a lot based on the season, time of day or day of the week, like eCommerce sites around the holidays, or gaming sites on nights and weekends. Compute capacity can be purchased for all of these types of usage patterns such that enterprises can direct its investment dollars to precisely where, and when, the capacity is needed, minimizing unused and/or underused capacity.
Mobile Operators Can Extend the Value of Enterprise Mobility to Cloud Services

In addition to being able to offer enterprises the cloud services outlined above, mobile operators would be able to combine their current enterprise voice, video, messaging, and machine-to-machine (M2M) services to offer unique and compelling cloud services. Operators would be able to leverage their unique and proprietary access to device, network and session-level information—for richer applications and services. Some of the possibilities include:

- Hosted applications. Key enterprise applications like SAP, Oracle, Microsoft, and Salesforce could all become more powerful when combined with the communications and location services enabled by network- and session-level information from mobile networks.
- Vertical applications. Example: Point of Sale and retail interaction on mobile devices is a significant opportunity to use secure authentication, licensed spectrum attachment, and PCI compliant system hosting to transform operations agility and expenses.
- Analytics. As more and more enterprise applications are used via a mobile device, the ability to harness the unique information that only mobile operators can provide, including location, and session-level information will be key to truly understanding user behavior.
- Security, web and content filtering. These services, when offered by a mobile operator, can extend into the network core and radio layers of the network, creating unparalleled depth and control over enterprise content.
- Network monitoring. Using signaling and session-level information that are only available to mobile operators, mobile operators can extend cloud-based network monitoring into the radio and core networks. Thus offering greater depth of network monitoring services.
- Application hosting and management. Mobile operators would be able to give hosted applications exclusive access to device and network-level information (like location, what other applications are running, etc.).
- Enhanced corporate voice, video, and messaging communications. By incorporating enterprise mobility services directly into the cloud applications, mobile operators are in a unique position to provide cloud and communications services with an unmatched level of integration and control.

In addition to leveraging enterprise mobility services, mobile operators have two very strong advantages when offering cloud services to enterprises: security and authentication and integration services.

Security and Authentication

Mobile network operators can leverage their exclusive ability to do SIM authentication on top of Enterprise directory authentication for a multilayer security service that is vital as mobile devices (with SIM cards) increasingly dominate enterprise computing and communications.

Enterprises will benefit greatly from the security from an operator’s privacy and fraud prevention operations. When an enterprise mobile device goes missing, people typically know immediately, and mobile operators are very well practiced at locating and controlling for lost or stolen devices.

Invisible multi-layer authentication can help enterprises offer their users a secure and easy user experience when they access corporate resources through their mobile devices. The device itself does the hardened, second-factor of authentication via its provisioned operator identity (SIM) instead of employing often cumbersome and expensive external hardware and/or software.
Cloud service providers also offer network-based security products including firewalls, intrusion detection and prevention, event and information logging, encryption solutions, network and user monitoring, forensics and analytics. These are important so that global network traffic can be secured and go to the “nearest & best” cloud service point instead of all the way back to an enterprise data center that could be on the other side of the world, thereby minimizing transmission costs and optimizing network performance.

Combining these network-based security services offered by cloud operators with client or access-level security solutions like SIM authentication and enterprise directory would give enterprises a very powerful, end-to-end, multi-layer security solution that simplifies secure access, and opens opportunities to significantly improve performance and end-user satisfaction.

**Integration Services: Pain Management**

Many cloud-based data center services being offered today require enterprises to take on the role of system integrator, which for many is a financial and logistical burden. This is especially true when trying to marry mobile services, internal IT and multiple external service providers. When undertaking cloud projects, enterprises are often tasked with integrating the service with existing applications, infrastructure and workflow. These often hidden or inexplicit costs detract from the focus, productivity and profitability of the enterprise, when just the opposite should be occurring. That is, outsourcing key computing and communications infrastructure should lead to increased profitability and cleaner workflows, without (hopefully) short-term integration pains.

Mobile network operators can take this burden off of enterprises and simultaneously add value (and revenue) through hosted unified communications and other enterprise mobility services, such as mobile device management, location-based services, and regulatory or compliance services.

AWS has partnered with leading consulting and technology outsourcing firms like Accenture, Capgemini, and Wipro to help to provide some of these key integration services. As mobility becomes increasingly important for enterprises, and central to their IT initiatives, mobile network operators will be in a unique position to provide vital mobile and cloud applications and integration services.
An Opportunity Too Large and Too Strategic to Ignore

Outsourced enterprise data centers and cloud services will present mobile operators with a revenue opportunity in the hundreds of billions of dollars over the next decade. This opportunity builds upon many of the trends already underway with regard to how enterprises are thinking about outsourcing and using cloud services, such as how they might best leverage the new computing and communications models to reduce their overall costs and increase their flexibility and productivity.

Enterprises are now considering ways in which to use cloud services in order to save money, to stay flexible and to more easily stay current on the latest technologies. Enterprises are also looking at ways to enhance their communications services and, since mobility is at the center of enterprise communications, mobile operators are key to this transformation. Much the value that mobile operators will be able to offer enterprise customers will be via services and features that are hosted within the operator data center. These services include the large family of common applications that every enterprise must have to operate their business as well as select vertical market/domain specific services. Specific vertical market services are the sweet spot for operators as they are easy to quantify and position to an enterprise buyer.

Mobile operators have begun to require that their network vendors deliver products (hardware and software) that support software defined networking (SDN) and network function virtualization (NFV). These technologies are designed to leverage low-cost computing platforms along with virtualization and orchestration software to coordinate computing resources that significantly reduce the need to expensive specialty networking devices, and offers end-user elastic and pay-as-you-go capacity.

These trends can help enterprises in many ways. Cloud services can lower costs, increase flexibility, and increase focus such that internal IT departments can focus on issues specific to their business, not to more generic computing, mobility, security and communications issues. The potential competitive differentiator for operators is to offer a larger integration framework so the total available market (TAM) is not limited to enterprise customers that are large enough to have staff that can perform the system integration themselves. Rather, by opening the doors for a lower tier of enterprise that want the latest in cloud and enterprise communications services, but does not have the in-house staff, mobile operators greatly expand their TAM over the next 5 years and beyond, whereby simple, functional and stable rule the day.
Enterprise Data Center Services Forecast

Figure 1: Enterprise Data Center Services Revenue Forecast

Exact Ventures forecasts that the Enterprise Data Center Services market will increase from nearly $13 B in 2013 to over $74 B in 2020, a compounded annual growth rate (CAGR) of 29%. Through 2012, the enterprise private cloud segment was the largest component at $3.6 B and is forecasted to grow 3% CAGR through 2020 to reach $5.1 B. Growth in this segment will be relatively light as enterprises increasingly choose the flexibility associated with virtual private cloud and IaaS services. The virtual private cloud market is forecasted to grow from $2.3 B in 2013 to over $19 B in 2020, a CAGR of 35% while the IaaS market is expected to grow from $6.4 B to $50 B over the same timeframe, a CAGR of 35%. Please refer to the Definitions section for an explanation of each of these segments.

Other segments like Platform-as-a-service (PaaS) and Software-as-a-service (SaaS) we considered out of the scope of potential business for mobile operators, and thus not included in this sizing of the market. Nevertheless, mobile operators are offering M2M services as a PaaS offering.
Competitive Imperative
Mobile operators have an incentive to enter (either through partnerships, or on their own) the enterprise network data center services market(s) because, as outlined below, it is a large and fast growing market, but also for competitive purposes. The leading data center and cloud service providers (AWS, Google, Microsoft, etc.) have already significantly impacted mobile operators’ voice and messaging businesses. Mobile operators will need to change their business and their networks to look more and more like cloud service providers, if they want to sustain and grow their revenues and profits in the coming years. Enterprise cloud services will greatly complement mobile network operators existing enterprise efforts, as well as to better enable them to meet their competition on their own terms.

Build, Buy or Partner?
Several mobile operators, through their parent company umbrellas have launched and are investing in Enterprise cloud services. Verizon, for example, has their Terremark business. NTT Communications has invested nearly $1 billion in acquiring Verio, Virtela, and RagingWire to bolster their enterprise data center services business and expertise. We expect that these types of investments will only accelerate in the coming years.

Enterprise cloud and data center services, combined with the emerging enterprise mobility services, can offer enterprises a powerful end-to-end communications and computing resource. In cases where mobile operators do not have these skills and resources in-house, they may be well served to partner or acquire such expertise. AT&T Enterprise, which offers their own enterprise cloud services, has partnered with IBM, to sell IBM’s SmartCloud Enterprise in conjunction with AT&T’s NetBond VPN service.
Definitions

Enterprise Private Cloud
An Enterprise Private Cloud consists of dedicated, exclusive, computing resources housed within a data center environment. Private clouds tend to appeal to those organizations that have large compute and storage requirements, and/or have very strict control, security and compliance needs.

Virtual Private Cloud
A Virtual Private Cloud (VPC) is an on demand, configurable pool of shared computing resources allocated within a public cloud environment, providing a certain level of isolation between the different organizations using the pooled resources. In many cases, by segregating cloud resources and the hypervisor from other customers, VPC can alleviate security and regulatory concerns, and eliminate potential public cloud performance issues.

Infrastructure-as-a-Service (IaaS)
IaaS is a service offering whereby computing and server resources that are owned and hosted by a service provider are offered to customers on an as-needed basis. Typically, users pay for these resources based on the amount of capacity that is used. Often, enterprises are able to manage these resources on their own using a Web-based graphical user interface (GUI). API access to the infrastructure may also be offered as an option so that enterprises can create their own custom applications to utilize the virtual infrastructure and services.
About Exact Ventures
Exact Ventures is an independent market intelligence firm that creates unbiased, enduring benchmarks for measuring market shares and understanding and quantifying market transitions and market opportunities within its coverage areas.

Exact Ventures offers market intelligence with greater depth and context than traditional, static silos of market data. Exact Ventures’ research combines both supply and demand-side market intelligence, and highlights the economics underlying emerging and transitioning markets and technologies.

Greg Collins
Founder & Principal Analyst
Greg Collins is a technology analyst and strategist with extensive experience in creating innovative, highly analytical and enduring market segmentation and research practices in technical networking, telecommunications and wireless markets. Greg founded Exact Ventures in 2011, in order to provide market intelligence and analytics for emerging and transitioning technology markets.

Greg was an industry analyst with Dell’Oro Group from 1998 to 2011, during which time he created and/or managed approximately half of the company’s research. He created the company’s coverage of the Layer 3, Layer 4/7, and 10-Gigabit Ethernet markets, and created market research practices covering the Wireless LAN, Mobile Infrastructure, IP Multimedia Subsystems (IMS), and Wireless Packet Core markets. All of these programs were at the forefront of market research, and have become standards for quantifying market shares and understanding technology shifts.

Greg is a frequent speaker at industry events worldwide, contributes articles to various industry publications, and is often quoted in leading trade and business publications. Greg holds a BS in Economics from Carnegie Mellon University, and an MBA in Finance and Marketing from Washington University in St. Louis.