



HOW TO UNLEASH THE BENEFITS OF VIRTUALISATION DURING YOUR NFV TRANSFORMATION

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INTRODUCTION

The theory of virtualisation is well understood, but the transformation from hardware-defined to software-defined technologies is taking far longer than expected as communication service providers (CSPs) grapple with the complexities of transforming their network hardware, operational processes and business models simultaneously. The sheer scale and scope of the current transformation dwarfs even the telecoms industry's greatest shift to date, the move to IP technology that began in the mid-1990s. This was merely a network technology upgrade but still took more than a decade, so it's unsurprising today's multi-dimensional transformation projects are taking longer than expected to bear fruit.

The length of time transformation is taking, and the perception that momentum is slowing, reflects the reality that total business transformation is much more complex than the theory. Talk of virtualisation makes it sound simple, but organisations have taken the opportunity to fully consider all the implications, delaying widespread deployments and still confining their activities to pilot and trial projects. This measured and cautious approach doesn't mean full virtualisation won't happen – the benefits are too compelling for it not to. However, it will take longer and be more complicated than originally expected.

A LONGER ERA OF HYBRID OPERATION

The added complexity and the wise caution amongst CSPs means the phase of operating part-virtualised/part-physical networks will run for many years and well into the next decade. CSPs must therefore maximise virtualisation benefits by selecting technologies and following transformation strategies that deliver rapid return on investment (ROI), while positioning them for full virtualisation in the future. This approach means that islands of virtualisation will be created within CSPs. These should be built to be ready to integrate with other deployments, ultimately forming part of a complete virtualised ecosystem.

THE NEW ROLE OF O/BSS

Operations and business support systems (O/BSS), instead of becoming a management layer for network hardware and supporting operations, now becomes an enabler of the microservices stack. CSPs benefit not only from flexible, agile network operations but also from a new services environment. The absence of function-specific hardware means traditional silos of network hardware will



disappear. Traditional IT stacks of O/BSS also will be replaced with new architectures that reflect the more flexible and dynamic network architecture now being utilised.

A key challenge for CSPs is to prevent recreation of the traditional silos simply because the structure makes sense from a traditional operational point of view. The virtualised era should not be about recreating the same structures as the physical era, just with virtualised infrastructure. This will not deliver on the full promise of virtualisation; it will only save capex on equipment purchases.

SHOW ME THE MONEY

Significant concern exists about where revenues will come from in the virtualised landscape. A shift away from traditional structures will require new business models. For example, if network equipment changes purpose from supporting one service to another, it will be challenging to identify a cost base.

In addition, as customers and partners take greater control of the services the network delivers – perhaps through open application programme interfaces (APIs) – CSPs will know less about the services being delivered, and therefore could have less opportunity to derive value from their infrastructure. The flip side to this argument is that CSPs have a great opportunity to show their worth to partners by assuring premium connectivity, supporting over-the-top (OTT) providers, which are now starting to be seen more as potential partners than direct competitors, with billing, security and other services. All of this is monetisable, along with expected new revenues from a vast array of microservices.

Today, the lack of clarity around which new business models and partners will generate additional revenues presents a substantial challenge. Without certainty about this, CSPs are being asked to invest in virtualisation without a clearly defined business model to support such investment. A leap of faith is too big an ask to gain the massive investment resources required for full-scale virtualisation projects that address the entire transformation in one go. The business case – or, more accurately, the absence of a robust investment rationale – continues to hold back CSPs' transformation plans.

CLOUD MIGRATION

A key element of the operational and business models will be the migration to cloud-based technologies. The performance benefits, operational cost savings, and flexibility are attractive. Nonetheless, cloud migration represents a step into the unknown for many CSPs. While CSPs now have a good understanding of the advantages of cloud-based platforms, technologies, and services, this understanding needs to permeate through the business before carefully thought-through strategies for cloud migration are established.

The pace will be set by individual CSPs, according to how far they want to go in the shift from keeping IT on-premise or moving to private or public cloud. The speed and scope of cloud migration will depend on each CSP's current operations, strategy and comfort level.



HOW TO BENEFIT WHILE TRANSFORMING

It's clear that CSPs are against large-scale rip and replace projects on the grounds that the cost and risk will be too great. In addition, they also need time to transform their workforces, processes and operations – not just the technology. This scale and complexity of this transformation should not be underestimated. However, it is possible to unlock business benefits during the transformation journey.

There are opportunities to deploy virtualisation in ways that benefit your business today, providing return on investment and positioning your business for the future. These projects should be addressed first to show success and keep organisational support for the wider transformation.

CASE STUDIES & EXAMPLES

The complexity of the transformation journey CSPs are engaged in means it is not only CSPs themselves which must make technology decisions. Their suppliers also must be challenged to identify, adopt and roll out technologies that enable embedded technologies to be provided to CSPs at a TCO that makes their offerings attractive and enables CSPs to harness operational efficiency.

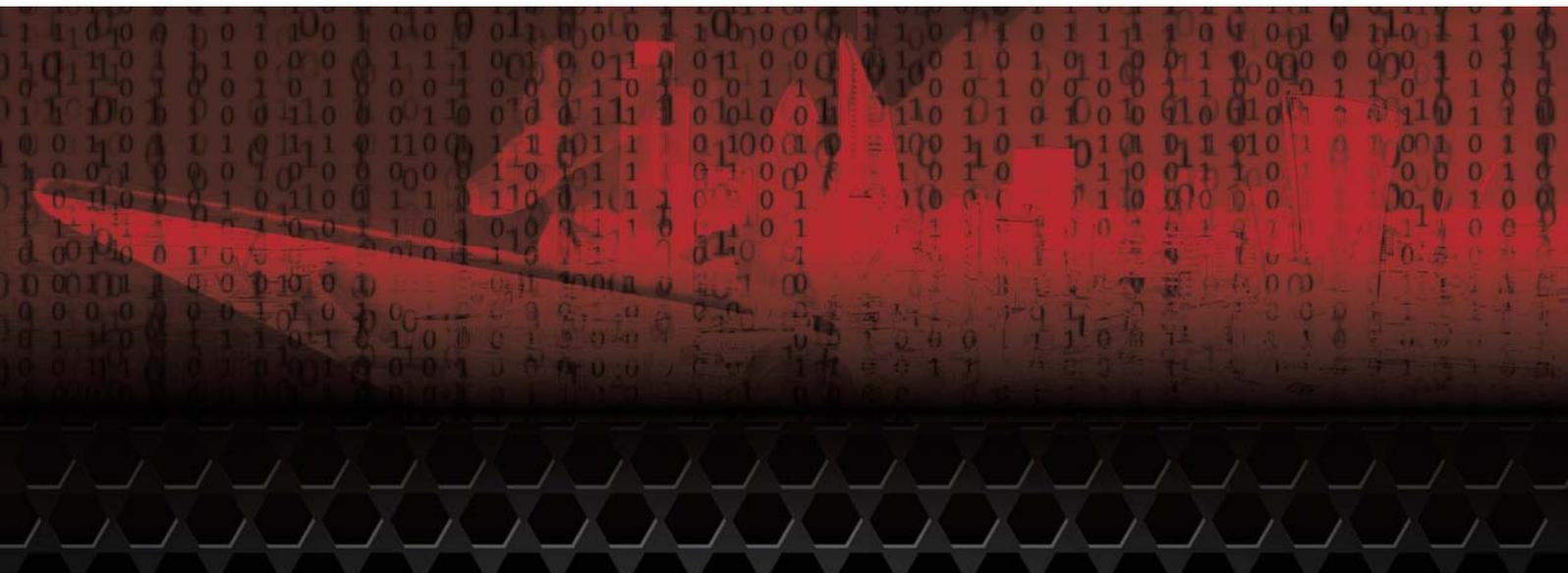
EXAMPLE 1: Cloud-deployable, transactional database

One example of a CSP supplier that has adopted new technological approaches to address the new mode of operation is Openet, an independent supplier of real-time business support systems (BSS) to CSPs. The company's software ensures that more than 600 million mobile telecommunications users around the world enjoy the best network and data experience while also enabling mobile operators to monetise data use in real-time. Openet's real-time BSS systems process the massive volumes of data streaming through a network, use that data to track activity such as network usage for many millions of users simultaneously, and perform real-time actions such as billing and managing connection quality.

OBJECTIVE

The Openet Fusionworks Framework is the advanced software architecture upon which all of the company's solutions are built. It is a high-performance environment for Openet's modular software, enabling seamless integration, centralisation of common functionality, and support for custom logic. Fusionworks delivers a flexible environment to support configurations that meet a service provider's unique needs.

Openet enables the world's largest network operators to innovate service offerings in an increasingly mobile, data-driven society. Applications include policy manager, evolved charging and converged mediation. Openet's modular software architecture enables infinite configurability to meet the specific needs of a service provider. This modularity provides Openet with the flexibility to meet future needs at much lower cost and risk than is possible with purpose-built systems.



In late 2012, Openet began evaluating potential replacements for its database infrastructure, primarily to drive down the TCO of its applications and solutions and to better support the real-time demands of mobile data. According to Oisín Loftus, the executive director of Product Development for Openet: “We wanted to move toward a higher-performance, in-memory database that could combine the capabilities of an operational database, real-time analytics, and stream processing in one easy-to-use platform. We needed an in-memory database that could handle fast data, and we needed a database technology that would be complimentary to our innovative software solutions and suitable for virtualised deployments. We also needed a database that was elastically scalable and could grow and contract as needed.”

SOLUTION

Openet selected VoltDB as the logical choice for a cloud-deployable, transactional database that can flexibly handle high-volume data streams for service providers to monitor and utilise in real-time.

VoltDB provides the performance of in-memory, the scalability of NoSQL, and the transactional consistency of traditional relational databases.

Traditional database systems were simply too slow to ingest data, analyse it in real-time and make decisions at the rate required. With VoltDB, Openet now offers transactional, database-oriented applications against data feeds that were previously limited to stream processing methods because of scale. Since Openet solutions are always inline in a service provider’s call path, Openet required latencies for its transactions to be sub 20ms, so performance and scalability were major requirements.

“Our solutions are primarily deployed by Tier 1 and Tier 2 operators worldwide, so we need a virtualised database platform that can provide elasticity while supporting ease of operations,” adds Loftus. “VoltDB not only meets the latency requirements of our customers but also simplifies deployments with Atomic, Consistent, Isolated, Durable (ACID) properties and built-in high availability for risk-averse service provider customers, and offers the performance and scalability necessary to provide real-time control of network resource consumption. VoltDB offers the TCO, performance and scalability we need while enabling us to handle fast data and the real-time feeds of service provider traffic.”

RESULTS

Openet integrated VoltDB to provide the in-memory database infrastructure that supports its wide range of business support systems (BSS) to enable automated, real-time decisions. VoltDB is a fast in-memory database that supports SQL and ACID compliance to provide the high-throughput and low-latency response Openet applications need to make decisions in real-time.

“We can deploy VoltDB on virtualised infrastructure, which means Openet can scale VoltDB up or down and easily create new instances of VoltDB to support new customers,” says Loftus. “This provides us with the flexibility to scale our deployments and a more attractive economic model than possible with our legacy database infrastructure.”



VoltDB is embedded into the Openet FusionWorks Framework and supports all major Openet applications. “Our customers primarily care about the features we provide and how fast our solutions perform,” Loftus explains. “For example, customers want to know that our policy and charging applications are completely virtualised and elastically scalable. VoltDB provides Openet with an in-memory database that helps us take advantage of fast data and scale to meet the needs of our customers.”

EXAMPLE 2: Transforming big data into useful insights

To differentiate its offering and help operators take advantage of real-time analytics and decisioning, Emagine International, which provides a real-time, adaptive contextual marketing platform and managed marketing services for mobile service providers, selected VoltDB’s in-memory scale-out SQL database as the core of its Emagine Real-time Event Decisioning (ERED) platform. This has allowed Emagine to architect a fast data solution that requires three milliseconds for the ingest-analyse-decide journey through the ERED platform, enabling Emagine to deliver customised offers to subscribers in fewer than 250 milliseconds. Mobile operators that use the ERED platform can achieve a measurable ROI in real-time personalisation.

A real-time architecture has the ability to process data as it arrives, rather than storing the data and retrieving it at some point in the future. “In the context of a service provider, we take the present to mean the attention span of the subscriber while they have the device in their hands,” explains Emagine CTO, Srikanth Markonda. “We therefore define real-time for service providers as under 250 milliseconds for end-to-end journey time from network event to action with the customer – regardless of the volume or variety of the data being processed.”

Emagine needed to design a real-time engine that could complement its existing Adaptive Contextual Marketing platform, which uses the latest technologies and techniques in machine learning and big data analytics to reveal deep insights into customer behaviours. After evaluating fast data technologies, Emagine selected VoltDB to provide real-time analysis of subscriber data based on event triggers such as the end of a call, use of the mobile device in a particular location, or a user hitting a data usage threshold.

VoltDB is a ground-up redesign of the traditional relational database architecture designed to run 100% in memory on scale-out commodity hardware. It provides record-breaking transaction performance with the familiarity of SQL and the data consistency and reliability of traditional relational systems – but with none of the data consistency trade-offs of NoSQL offerings. VoltDB’s innovative architecture makes it easy to power fast data applications in a way not possible with existing technologies to analyse real-time streaming data, make decisions, and swiftly deliver targeted information and offers to mobile subscribers.

“We conducted a global search and selected VoltDB because we believe it’s the world’s fastest and smartest in-memory database,” says David Peters, the chief executive of Emagine. “It met our core requirement for sub-250 millisecond



response time. In terms of transactions per second, it's highly scalable and delivers the performance we need."

To learn more about Emagine's VoltDB deployment visit:

https://www.voltdb.com/wp-content/uploads/2017/03/VoltDB_Emagine_Case_Study.pdf

CONCLUSION

As CSPs continue their transformation journeys, they are exploring new business models in the extended digital value chain and its long tail. At the same time they're grappling with new technologies such as network functions virtualisation, 5G mobile, and cloud-enablement. They are facing great complexity and the continuing need to control costs and manage investment to produce the greatest rewards, while resetting their cost base to remain competitive.

VoltDB can be used as a key component of a proprietary software stack, or it can be used in a virtualised cloud environment to provide the required extremely low-latency, highly-reliable functionality CSPs need. VoltDB lies at the heart of enabling CSPs to successfully modernise their architectures from specialised OSS/BSS stacks to NFV, ensuring their competitiveness for the future and in new opportunities such as the Internet of Things.

To learn more about how VoltDB's high-velocity data ingestion engine enables organisations to generate insights from streams of incoming data on a per-event basis, visit: www.voltdb.com

MARKET DATA

According to **Technology Business Research's** (TBR) latest NFV/SDN Telecom Market Forecast, covering 2015 to 2021, **the NFV and SDN market will grow at a 116% CAGR through to 2021** to nearly **US\$158 billion**. Early adopters, such as AT&T, began to ramp up investment in 2015 as transformation became their top strategic priority.

Cloud native applications and network functions, as an evolution of the virtualisation of the telecoms network, **have the potential to substantially improve capital efficiency** for CSPs in an industry that spends \$300 billion annually on network, compute, and storage, reports **Appledore Research Group**.

The **digitalisation of telecommunications could unlock \$2 trillion of value** for the industry and wider society over the next decade, reports the **World Economic Forum**. By enabling the digital transformation of other industries, the sector also generates societal benefits.

MobileWorldLive Annual Survey 2017 found that **45.2% of respondents think virtualisation will bring costs down to a sustainable level** but 42.9% are not sure this will happen.

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