» Whitepaper «

Cloud Evolution: The Carrier Cloud

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If you had never seen a 'real' computer and were to research the latest directions in computing it would not be surprising if you thought they were comprised of condensed water vapor and floated in the sky. Cloud computing and all the associated data center and networking infrastructure is very real and solidly grounded in a market that is growing rapidly in every conceivable direction.

Figures from IDC and Forrester underline how changes are sweeping through the IT value chain. Looking at the overall global market for cloud computing, Forrester forecasts growth from a base of nearly $41 billion in 2011 to more than $241 billion in 2020. Looking at things from the perspective of how spending is changing IDC predicts that by 2015, approx. 24% of all new business software purchases will be of service-enabled software with SaaS delivery being 13.1% of worldwide software spending. Mobile access for cloud applications and services, although somewhat of a security headache for corporate IT, is growing similarly. According to the Strategy Analytics Wireless Enterprise Strategies forecast, "Corporate Mobile SaaS Forecast, 2010-2016," the Global Corporate Mobile SaaS Market will grow to $3.7 billion by 2016, with a five-year compound growth rate (CAGR) of 25.8 percent.

Global Cloud Computing Revenue ($B)

Data from Forrester Research
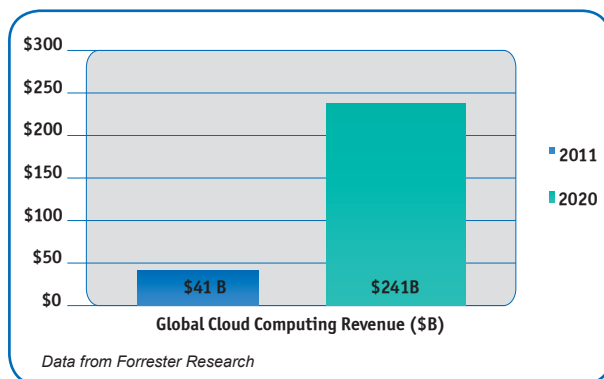
With the promise of lower (or at least better managed) costs, near infinite capacity and application elasticity/scalability, and unprecedented levels of flexibility, Cloud Computing would seem to be the utopian IT solution, but can it do everything? As a model, and Cloud Computing is really a new and more powerful variant of the original time sharing computing model, it probably can do nearly everything. However, real life implementations, depend on the underlying architectures and capabilities of the application, compute and network infrastructure and as such the typical cloud data center has certain attributes that are keeping more than a few IT directors up at night.

The ease of scalability without the need for further CAPEX investment is extremely attractive but such elasticity comes with another cost. With all one's applications now hosted in the cloud, direct control is limited and with the data center potentially across the country or worse across the globe the Internet becomes the weak link and the cost can be seen in terms of performance and security. An Alcatel- Lucent study

(Global Cloud IT Decision Maker Study) from last fall validated these concerns as over 3,500 enterprise decision makers cited performance issues as the key inhibitor to them increasing their usage of public cloud. Data security was a close second place followed by 'ease of use' and 'cost' that in theory is one of the clouds golden bullets.

The business and technology models that kicked off the whole cloud boom have been largely reliant on the use of the standard public Internet infrastructure as the connection medium between the 'user' and the datacenter. Performance (i.e. latency) is therefore in no way deterministic and one's critical business data is traversing hundreds of network nodes in locations one can only guess. Recognizing these challenges and the associated business opportunity, the Telecom segment, has decades of experience building out complex high performance networks, is helping cloud computing evolve with the advent of the carrier cloud.

Carrier Cloud - All the Benefits Plus So Much More

The carrier cloud has all the same fundamental benefits of the public cloud in the sense that it is built around a virtualized data center, but it has a number of key differentiators.

1. The carriers complete network becomes part of the offering and allows for complete end to end services. The bringing together of the network and datacenter infrastructures under a single umbrella removes the dependency on the Internet and all the associated issues. The carrier can provide as much local bandwidth as is required for the application environment and also controls everything all the way to the backhaul connections to the data center itself.

2. Computer resources can be made available outside the data center if required, significantly improving performance. Due to the last mile topology of carrier networks there are ready built, secure, carrier grade, local and central offices in every city. Mini data centers can be constructed in local geographies to offset the latencies associated with cross country or inter-continental backhaul.

3. All the infrastructure from network to data center is built using the same carrier grade approach to reliability and availability. The carriers have decades of experience building not just highly reliable but highly available infrastructure. Having built networks where individual elements must meet stringent 5 NINES (99.999% availability = ~ 5 minutes downtime per year) requirements many carriers now have 6 NINES capabilities that equate to approx 30 seconds of downtime across a whole year, and that includes maintenance and software upgrades.

Carrier Cloud Application Opportunities

The establishment of the carrier cloud enables application opportunities for Carriers and Service Providers that apply both internally and externally.
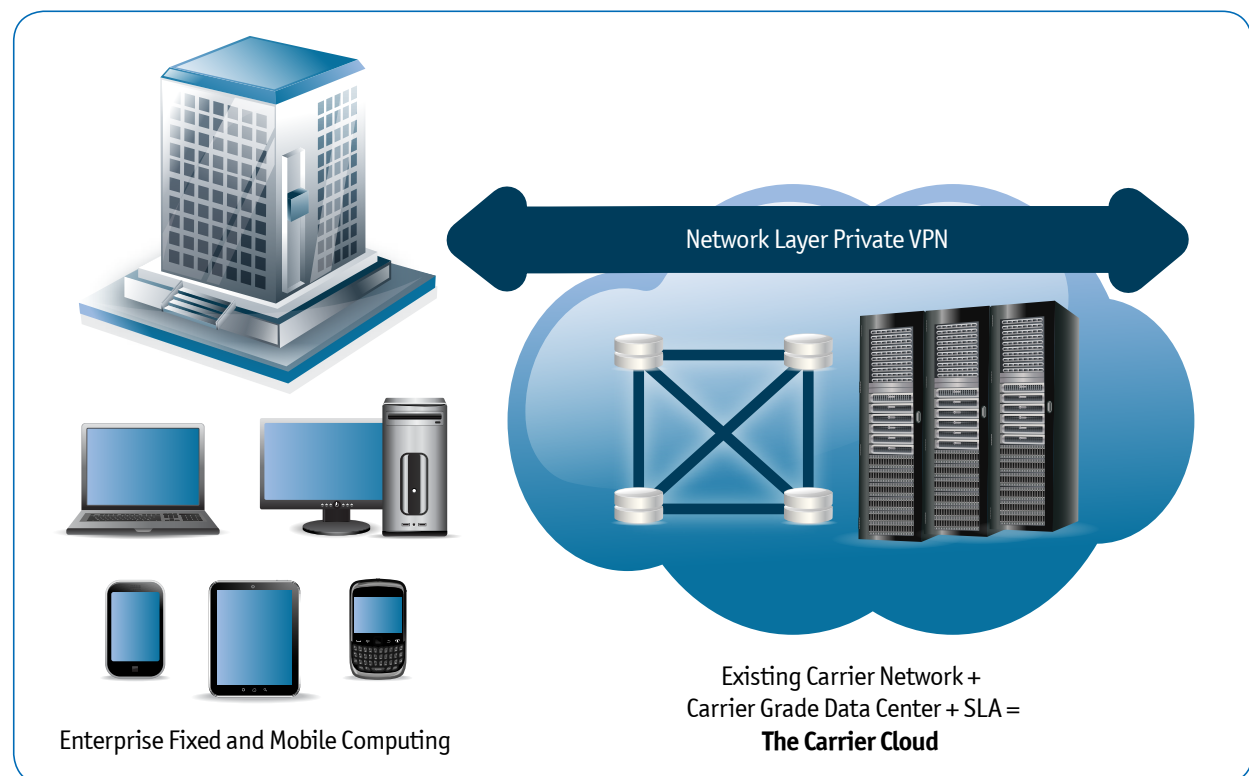
Internal Applications

Today's complex networks contain much more than basic telephony and a significant amount of application software running on carrier grade compute servers. Existing internal services such as IMS, Media Serving or Push to Talk, have, through necessity, had to be deployed relatively close to the point of presence. Carriers have needed to invest in

External Applications

Through the addition of their own virtualized data centers Carriers open up significant new revenue streams. For enterprises such as those mentioned earlier who express concerns over the performance and assurance of the public cloud, carriers can offer a new breed of end to end cloud service that they are prepared to backup with specific Service Level Agreements (SLAs).

Carriers that operate both fixed and mobile infrastructure will be in a unique position to help enterprises that need to have cloud based applications that will work in both environments while providing their clients end to end control. VPNs are a commonplace carrier offering today but when combined as a total virtualized compute package a

Network Layer Private VPN

Enterprise Fixed and Mobile Computing

Existing Carrier Network +
Carrier Grade Data Center + SLA =
The Carrier Cloud

equipment and use traditional over provisioning techniques to ensure appropriate levels of service. The ability to use cloud virtualization techniques enables carriers to gain significant flexibility and cost benefits.

The carrier cloud is also enabling evolved business models, as both equipment and solution providers that have previously sold their entire hardware and software solutions to carriers are beginning to offer the same solutions as a cloud based service. They may use existing public data center locations but the now cloud-based solutions provider installs their own carrier grade equipment. Being able to deploy equipment anywhere within their own network or take advantage of lower 'hosted' services provides much improved flexibility and the potential for significant cost savings.

much greater level of security can be achieved while still VPNs are a commonplace carrier offering today but when combined as a total virtualized compute package a much greater level of security can be achieved while still maintaining performance and availability service levels.

Carrier Cloud Needs Carrier Grade

No matter who you are, if you want to participate in the carrier cloud space you must be able to show that you meet carrier grade requirements. Carriers need the same carrier grade compute servers to build out their carrier cloud

operations as they have used to build their highly reliable and available networks. Existing public cloud providers wishing to add carrier cloud to their portfolio will need to segment parts of their operations and install carrier grade servers and platforms. These platforms can the be used to offer the more highly available carrier cloud style service offerings.

Kontron Platform Products for the Carrier Cloud

Kontron have been supplying the world's leading network equipment manufacturers with highly reliable, mission critical server technologies for over 25 years . A wide variety of Kontron's NEBS/ETSI compliant carrier-grade servers have been used to build out their many communications and cloud-based technologies.

Delivering innovative ruggedized designs, long life availability and a short depth chassis options, Kontron AdvancedTCA platforms and Communication Rack Mount Servers are ideally suited for a broad range of telecom, large enterprise and data network applications. For those building solutions for the carrier cloud, Kontron's portfolio of carrier grade products include:

» 10G and 40G AdvancedTCA (ATCA) Open Modular Core Platforms - 13U/14 slot platforms that serve as the basic building block for carrier grade systems
  • ATCA processor blades with processor options including the Intel® Xeon® E5-2600, Intel® Xeon® 5500/5600 processors and MIPS64 Packet Processors
  • ATCA 10GbE and 40GbE Fabric Hubs
  • ATCA 4 Slot AMC Mid-size Carrier

» Communications Rack Mount Servers – 1U/2U carrier grade servers that implement a range of Intel Xeon processor options including the latest E5-2600 that matches the ATCA offering allowing customers to build a cohesive range of platforms all structured around a single compatible compute architecture.

Kontron can also tap into its multi-vendor ecosystem with chassis, node blades, switching, NSPs, DSPs, extended storage and software products that can be integrated into the customer's ultimate solution. The result is faster time-to-market with a system optimized to meet the carrier cloud infrastructure requirements.

AT8060
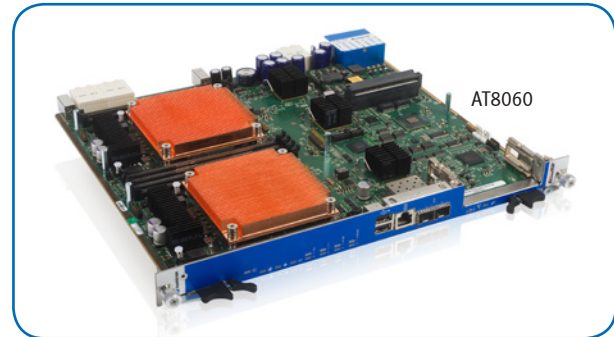
The two newest products in Kontron's carrier grade portfolio illustrate the performance, power efficiency and cost effectiveness of Kontron's carrier grade solutions. Both products are based on the Intel Xeon E-2600 processor family which was also designed with the needs of the carrier cloud in mind.

Kontron AT8060 ATCA Processor Blade

The AT8060 is the 6th generation single board ATCA processor module from Kontron and, in this edition, includes an AdvancedMC slot for customization. Based on dual Intel® E5-2600 processors, it is ideally suited for server functions in the carrier cloud and a wide range of application areas in telecom infrastructure including LTE Evolved Packet Core (EPC) networks.

The AT8060 uses the full bandwidth of the four DDR3 memory channels with 4 VLP DDR3 Sockets per CPU. Dual 8GT/s QPI interfaces between both CPUs provide 40GByte/s/direction for a minimum latency on memory access and inter-processor communication. The improvements in memory latency help significantly to increase channel densities and ultimately the number of supported users per blade and platform.

High speed interfaces such as dual 10GBase-KX4 in the fabric interface can deliver maximum performance using the PCIe 3.0 interfaces from the processors. SAS2 interfaces are connected to RTM interface from the PCH for storage.

The AT8060 operates in two power level modes, a regular power mode up to 225W for NEBS-like operation and a High Power mode up to 350W.

When integrated into Kontron's OM9141-40G Open Modular Core Platform that can support up to 10 AT8060s along with up to two AT8940 ATCA 40GbE capable switches, one will have one of highest capacity and the most powerful carrier grade platforms available for carrier cloud applications.

Kontron CG2200 Carrier Grade Server

The CG2200 Carrier Grade Server may look just like any regular general purpose server platform, but unlike its enterprise brethren it is designed to meet the needs of the carrier cloud. This is Kontron's 5th generation NEBS-3 and ETSI-compliant 2U rack mount server and it is equally at home in the Telco central office or the network data center. The CG2200 combines the performance, ruggedness and reliability required of long life-cycle products. It provides dual socket support for the Intel® Xeon® processor E5-2600 series, bringing the outstanding processor and I/O performance with power efficiency features described earlier to a 2U rack mount server.

CG2200

In contrast to standard enterprise style servers the CG2200 has been designed to withstand extreme heat, humidity, altitude and zone 4 earthquake shock and multiple other extreme environmental conditions in compliance with NEBS-3/ETSI requirements. Also important for the rigid requirements of the telecom central office, the server includes advanced server management and Telco alarm management features that provide visual, audible (optional) and SNMP event indications of faults.

Key features of the CG2200 are designed with the specific needs of the carrier cloud in mind and include:

- » Long Life Availability
- » Ruggedization (NEBS-3, ETSI) – designed "from the ground, up"
- » Compact Chassis (20" depth) - ideal fit for telecom racks
- » Reliability, Availability, & Serviceability (RAS)
- » AC & DC Power
- » Flexibility & Expandability
- » Front and Rear I/O
- » Vibration Suppression Technology
- » Software Support
- » Experience & Customer Orientation

Kontron has integrated innovative vibration suppression technologies into its communication rack mount servers which benefit customers by allowing denser systems to operate at higher temperatures, thus, enabling the customer to deploy their solutions in environments not previously possible.

Both new Kontron products with new Intel® Xeon® processor E5-2600 family provide approximately 3x more performance and memory speed (2.7x more cores and 3.2x more memory bandwidth) than previous processor generations. Along with the carrier grade features and certifications, both products are the natural 'next step' in Carrier Cloud and Mobile Infrastructure platforms.

Carrier Grade Means Kontron

The carrier cloud is already proving itself as a necessary adjunct to the rapidly growing enterprise cloud. A broad array of applications that are used as part of the existing telecom infrastructure could be adapted to use the virtualized cloud model but the majority of existing data centers just don't meet the standards needed to make this possible. Whether carriers themselves will build out the carrier cloud infrastructure or existing cloud providers will add carrier compliant facilities it is certain that carrier grade compute platforms and servers are at the heart of any architecture.

Kontron is providing a broad portfolio of products and services to create carrier grade solutions for the telecom and cloud computing markets. Their wide product range of blades, modules and platforms coupled with their complete set of customization, integration and professional services means that Kontron can quickly create a carrier grade system completely aligned with their customer requirements.

The new ATCA and CRMS products based on the Intel® Xeon® processor E5-2600 family provides the right mix of products to be the foundation for the next generation of Carrier Cloud and Mobile Infrastructure applications. So if you are going Carrier Grade, Go Kontron.

About Kontron

Kontron designs and manufactures embedded and communications standards-based, rugged COTS and custom solutions for OEMs, systems integrators, and application providers in a variety of markets. Kontron engineering and manufacturing facilities, located throughout Europe, North America, and Asia-Pacific, work together with streamlined global sales and support services to help customers reduce their time-to-market and gain a competitive advantage. Kontron's diverse product portfolio includes: boards & mezzanines, Computer-on-Modules, HMIs & displays, systems & platforms, and rugged & custom capabilities.

Kontron is a Premier member of the Intel® Embedded Alliance a   nd has been a VDC Platinum Vendor for Embedded Computer Boards 5 years running.

Kontron is listed on the German TecDAX stock exchange under the symbol "KBC".

For more information, please visit: **www.kontron.com**

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