The most compact, complete and cost-effective mobile core solution
Athonet has developed a highly distributed and efficient network that utilizes UMTS/HSPA, CDMA/EVDO and LTE broadband cellular radio technology but evolves it to conform to a “flat” architecture where all functionality can be flexibly centralized or distributed to the edge of the network (i.e. regional area, enterprise, airport, campus etc.). Communication between mobile terminals and enterprise/private services is completely handled locally by a Mobility Gateway node (the mobile equivalent of a router in a fixed line network), allowing higher effective bit-rates and very low latencies but without creating bottlenecks and without utilizing scarce backhaul communication resources.

Using PRIMO and its improved flat distributed architecture, customers are able to reap the full benefits of a cellular private network with real dedicated bandwidth without being affected by traditional mobile operator infrastructure issues. Network equipment and IP backhaul/backbone costs can be scaled down dramatically, while performance is greatly increased, compared to classical cellular network deployments where all mobile signalling and IP data traffic are concentrated in a few national sites. The distributed network architecture becomes increasingly essential as traffic increases because backhaul links must be used more efficiently to save capacity, latency and cost.

Furthermore, the network may be completely controlled, applying all necessary security policies, and easily scaled in line with the specific customer needs.

Instead classical cellular architectures require communications from a mobile terminal to corporate headquarters, or between two mobile terminals located in the same area, to be routed via one of the centralised switches typically located in a major city. Such an architecture has disadvantages in high traffic areas, business and mission-critical environments where it creates backhaul and service performance problems making it impossible to deliver the demanding Service Level Agreements requested by customers.

PRIMO is a proven very high performance compact LTE, UMTS/HSPA and CDMA/EVDO Core Network solution with WiFi support, fully integrated and deployed with MacroCells, Smallcells and WiFi APs.

PRIMO is a flexible solution that allows you to build up and evolve your network, modifying the architectural design based on your needs and protecting your investments. You can choose a centralized or distributed architecture or transition between them with a view to adapt to the customer base evolution and network infrastructure available.

Its main characteristics are:
- **PRIMO’s** distributed architecture enables much higher performance compared to existing centralised legacy systems.
  - Very low latencies (round-trip): 10-15ms in LTE, 40-50ms in HSPA.
  - High packet throughput using standard IT servers.
- Direct Internet connection via Fiber, DSL, Cable, Ethernet, Satellite, etc.
• Solves congestion in hotspots (bandwidth crunch).
• Prioritized and fully controlled service including access & traffic routing (Private Mobile) Network capacity can be shared between general public and premium private traffic (public safety, enterprise etc.).

PRIMO is the solution

PRIMO is the right product choice for a fast, complete, ready to use and cost-effective deployment in a number of scenarios:
• hotspots: public hotspots requiring extra localised capacity (e.g. campus, city hotspots, buildings etc.);
• enterprise high-performance network (indoor/outdoor): corporates, hospitals, industrial plants, airports, ships, planes, oil/gas rigs...;
• coverage hole & Rural areas: no/weak radio signal for high-speed data, independent local operators;
• Public Safety/Government: to manage disaster recovery situations, public safety network and applications in the overall government networks arena;
• testing: device manufacturer (dongle, smallcell,...), operator or integrator labs, app developers;
• MVNO+: complete control of your customer base in a MVNO approach

Complete Standalone Mobile Network

• The PRIMO Mobility Gateway implements the collapsed LTE Enhanced Packet Core (EPC) functionality UMTS/HSPA and CDMA/EVDO Core Network functionality including policing control and enforcement functionality.
• The Mobility Gateway is packaged together with the UMTS/HSPA/LTE/CDMA/WiFi base station component to form the complete compact and optionally portable PRIMO system.
• PRIMO is a fully standalone system that does not require external nodes to be operational and fully managed.

Main advantages of the PRIMO Solution

• Dedicated network solution that guarantees high service levels compared to normal mobile network (very low latency, dedicated broadband capacity, access and service control).
• Provides guaranteed access, bandwidth, priority for professional users based on profiles.
• Gain high ARPU consumer and business/professional customers (corporates, government...).
• Gain first-mover advantage in key business markets.
• Gain capacity in congested areas (for signalling & traffic).
• Maximize customer loyalty (e.g. high ARPU users).
• Faster installation than expanding the normal mobile network.
• Compact & transportable, PRIMO is simple to install, even for temporary use.
• No use of the mobile operator’s infrastructure (backhaul, RNC, Core...) and reuse of existing infrastructure (enterprise LAN, DSL).
• Can be deployed by operator in its “Cloud”.
• Simplified management (web-based) that can be handled by local enterprise IT team for day-to-day tasks.
• Unique coverage, capacity and performance with respect to competition in key areas where professional users are located.
• Traffic routed locally direct to Internet (e.g. DSL) for hotspot/digital divide or to local Intranet for enterprise users.
• “All Mobile” Enterprise: PRIMO replaces fixed network and removes WiFi coverage problems.
• Very high security (communications stay local e.g. within Intranet).
• Transparent integration with new and existing IP applications (e.g. VoIP, Video, messaging etc.).

**Very cost-effective for Capex and Opex**

Capture the broadband mobile opportunity with a very high quality and cost-effective solution:

- reduction in CAPEX;
- hardware required: only off-the-shelf servers and standard macro and small cell base stations;
- PRIMO is a software-based solution;
- reduced/No backhaul OPEX & greatly simplified network;
- PRIMO distributed software-based solution with efficient IP architecture;
- simple and quick installation and configuration;
- web-based management system with user-friendly look & feel;
- minimum operator commitment: flexible deployment that can be scaled from 1 upwards (unlike current systems);
- with PRIMO a higher quality network is smaller, costs less and is more flexible.

**Data traffic off-load**

- PRIMO can be used as a solution for:
  - traffic and signalling offload in hotspot areas;
  - dedicated enterprise business services;
  - public safety applications;
  - rural & regional networks.
- The ability to completely manage traffic and signalling locally is key to achieving performance targets required for consumer and especially “mission critical” enterprise and public safety applications.
- PRIMO is a multi-access system that can provide simultaneous traffic and signalling offload for LTE, WCDMA, CDMA and WiFi technologies using a single PRIMO Mobility Gateway.
- Flexible design provides capabilities for remote upgrading to upgrade capacities and add new WiFi access points or base stations at a later stage.
Platform

The **PRIMO** Mobility Gateway comprises software that is installed on standard off-the-shelf 3rd party hardware depending on customer needs (e.g. standard IT server, rugged etc.). The Mobility Gateway is packaged together with the UMTS/HSPA/CDMA/EVDO/LTE base station component to form the complete compact and optionally portable **PRIMO** system.

The Mobility Gateway is based on highly available and extensible software based on Linux OS.

The Mobility Gateway is structured to include a network management (O&M) module that supports:

- Configuration Management;
- Performance Management, and;
- Fault Management.

Access to the functionality is available via web-based GUI interface. This can help reduce operating and capital costs which can be a significant network startup hurdle. In particular, the web-based interface allows for day-to-day network management by a variety of defined users with one or more security access levels.

Operational in minutes

One of PriMo's key advantages is the ability to deploy the solution very rapidly. The system is operational in as little as 5 minutes. This is a requirement in several professional applications (civil protection, government, ...).

**PRIMO** is also fully transportable: Athonet can supply a complete compact solution based on **PRIMO** Mobility Gateway, BTS and antenna system with telescopic mast. Power can be supplied by a portable generator. If required the system can be connected to the outside world via microwave, fiber or satellite links.

PriMo is also available in a trasportable setup (luggage or rucksack) with embedded small cell (UMTS or LTE).

With PriMo you can immediately create broadband mobile coverage granting local and global voice and data traffic using standard devices (LTE, 3G, WiFi) with full authentication and QoS policies.

Complete management and monitoring system

- Multi-access-level Web-based GUI for Configuration, Performance and Fault Management;
- Simplified operations and reduced OPEX;
- Day-to-day config & management can be performed by a local team or IT Department;
- SNMP support for central Network Operations Center (NOC) monitoring.
PRIMO is the solution

PRIMO is the right solution for a fast, complete, ready to use and cost-effective deployment in a number of scenarios including: hotspots, enterprise, coverage hole & rural areas, public safety, government Mvno and lab testing.

Hotspots, smart-cities/buildings, stadium, concert, ships

PRIMO can offer both private services and public services, allowing sharing of infrastructure and guaranteeing bandwidth and priorities to “mission critical” private applications (SLA).

PRIMO delivers:
- dedicated internal and external wide-area coverage;
- broadband real-time communications directly connected to the secure Enterprise LAN or to Internet;
- dedicated standalone network that can guarantee any SLA independently from and without impacting the normal national network;
- information security (radio encryption, data never leaves the LAN) and mobile video surveillance, sensors etc.

Digital Divide, Rural/Regional networks

Fast and simple network deployment that enables users in rural areas to have nomadic/fixed/mobile Internet access and Voice-over-IP services.
- Suitable for “DSL replacement” applications.
- Suitable for local government use (e.g. communications for local government services belonging to multiple towns in a rural area).
- “MVNO” - services may be sold/managed by local/regional MVNOs.
- May be combined with M2M Communications (e.g. smartgrids, smartcities).

Enterprise environment: campus, healthcare, energy, airport

- Transparent integration with enterprise cloud approach (email, VoIP, data, etc.).
- Dedicated coverage (single or multi-site).
- Higher performance than normal mobile network.
- Access and service control managed by local IT team.
- Traffic routed locally (Intranet), high security.
- Guaranteed access, bandwidth, priority for users based on priority level.
- Fixed-Mobile and Mobile-Mobile traffic routed locally when enterprise user is within campus.
- PRIMO replaces fixed network and WiFi coverage.

Government: Civil Protection, Search&Rescue, Fire Fighting...

- Broadband access to field personnel enabling real-time communications towards the operation centers and Internet/Intranet.
- Distributed and Resilient network - No single point of failure.
- Real-time High Definition Video, voice, operations information, geolocation, messaging, M2M (sensors, remote control etc.).
- Nomadic and fully mobile (e.g. vehicle) communications.

MVNO+
- Complete control of your customer base.

Lab testing
- Suitable for mobile terminals and IP applications testing (dongle, smartphone, WiFi router, M2M device, etc.).
- Provides real-world experience.
- Enables operator to perform Functional testing, Stability testing,
Athonet Smartgrid and 3 Italy provide Enel with an innovative Industrial Internet of Things solution

Enel's Federico II power plant in Brindisi has been equipped with a communications platform that delivers dedicated coverage, using TDD-LTE wireless technology, and integrated communications between personnel, sensors, machines and applications, further increasing the quality, efficiency and safety of the plant for the management of mission-critical processes.

Brindisi, 25th February 2015 – Athonet Smartgrid, part of Enel's startup incubation program, and 3 Italy, a mobile operator part of the Hutchison Whampoa Group, have implemented a dedicated 4G-LTE network for Enel's Federico II plant in Brindisi, one of the most important and advanced power plants in Europe. Leveraging Athonet Smartgrid's technology, enhanced by Enel's acceleration, and the services of mobile operator “3”, a TDD-LTE ultra-broadband micro-network has been implemented covering the entire plant, ensuring data, live video and voice services, both fixed and mobile, with an optimal level of coverage, very low latency and service continuity assurance even during critical emergency situations.

The solution creates an independent dedicated micro-network that can be easily reproduced at any production plant and construction site.

The “IIoT”, Industrial Internet of Things, is the new Smart Industry paradigm that in this case has not only been applied to Enel's Brindisi power plant but also to the adjacent construction site of new coal storage domes. The two key strengths of the micro-network solution are:

- Athonet Smartgrid's distributed LTE Virtual Mobile Core Network (EPC) platform that provides guaranteed very low latency, highly reliable ultra-broadband service, delivering full control to the customer in a cost-effective manner using a fully virtualized software approach;

- 3 Italy's TDD-LTE technology, that enables optimal distribution of capacity amongst the two directions of data transmission: those that originate from sensors, terminals and videocameras (uplink) and those that originate from network platforms (downlink);

Athonet Smartgrid and 3 Italy have delivered a system that implements the distributed mobile network concept, often referred to as NFV, Network Function Virtualization: an innovative network, completely integrated with Enel’s ICT infrastructure, that meets the
industry's most stringent technology requirements. The solution enables both fixed and mobile applications such as live video surveillance of the entire area, monitoring of moving vehicles, audio-video communication amongst plant personnel and with the enterprise network or the outside world, sending and receiving alarms from fixed or mobile body-worn sensors.

The performance offered by the solution has enabled Enel to implement services for predictive diagnostics, workforce management, machine automation and, last but not least, safety of all operations in the power plant and construction site.

“We decided to invest in Athonet Smartgrid because we believe that the ability to rapidly create dedicated networks using LTE technology is an important enabler for us to improve productivity and safety of our production assets and to offer integrated services to our customers”, said Ernesto Ciorra, Head of Innovation and Sustainability at the Enel Group. “Through our open innovation strategy comprising continuous collaboration with highly innovative startups we aim to broaden our offer towards our customer base and Group companies”

“This new installation in a complex environment has confirmed the flexibility and high performance of our virtual mobile core that enables the creation of dedicated secure LTE mobile networks in very short timeframes and in remote areas”, said Karim El Malki, President of Athonet Smartgrid. “This is an important step towards the distribution and virtualization of the mobile network to offer innovative services to enterprises that were previously unthinkable, tailor-made to customer needs and that can be quickly reproduced for different environments and operational needs”.

“Once again 3 Italy demonstrates that it is a pioneer in the implementation of new technologies in support of development and innovation”, said Dina Ravera, General Director of 3 Italia. “Thanks to the opportunity we secured during the Italian government’s LTE frequency auction, having identified TDD as the ideal technology for the IoT, Internet of Things, we are now able to build efficient and competitive platforms to cater for this important sector of innovation and growth, including industrial and mission-critical applications”.

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3 Italia was the first mobile operator launching UMTS services commercially in 2003. Under the "3" brand, the company offers communication, fast Internet and TV mobile services to nearly 10 million customers. 3 Italia has always been at the cutting edge of next generation mobile technology by focusing on the mobile broadband as a driver to grow. 3 Italia has been contributing to Italy's development and to the digital divide reduction through investments of nearly 15 billion Euros in innovation. The company reaches, through its mobile fast Internet network, the 97% of population and has created employment for more than 10,000 people. 3 Italia is part of Hutchison Whampoa Ltd Group, an investment holding and Fortune's top 500 company, one of the main groups listed at the Hong Kong Stock Exchange, with operations in 52 countries, 270,000 employees and turnover for 53 billion dollars.

Enel is a multi-national power company and a leading integrated player in the world's power and gas markets, with a particular focus on Europe and Latin America. The Group operates in 32 countries across
4 continents, generating power from over 95 GW of net installed capacity and distributing electricity and gas through a network covering around 1.9 million km. Enel is a forerunner in the use of alternative renewable energy sources as well as in the development and implementation of smart meters, smart grids, electric mobility and energy storage projects.

Athonet Smartgrid is an Italian company specialized in the field of mobile telecommunications that has created an innovative mission-critical mobile network solution for electrical utilities. Using a virtual ultra-broadband mobile network infrastructure that provides very low communication latency, is compact, reliable, simple to install and manage, Athonet Smartgrid satisfies the most evolved requirements of Smartgrid distribution networks, Smartcities, production plants, construction sites and enterprise Microgrids. Athonet Smartgrid deployed the first wireless LTE Smartgrid using LTE technology in 2011. Athonet Smartgrid is a partnership between Athonet (www.athonet.com) and the Enel Group.

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Airbus Defence and Space delivers Tactilon® Suite for secure mobile broadband services to State Security Networks Group in Finland

New solution complements existing Tetra public safety radio network VIRVE by using commercial broadband mobile networks

Airbus Defence and Space has delivered the mobile core network solution Tactilon Suite for the Finnish authorities’ nationwide Tetra network VIRVE, operated by the State Security Networks Group. It is an important element that will complement the secure radio communications of the existing Tetra network, allowing the introduction of additional commercial broadband services in a secure manner. Using the Tactilon Suite, subscribers can be managed in both narrowband and broadband networks, including mobile operator networks.

The new solution has been developed by Airbus Defence and Space together with its partner Athonet. It will help to establish hybrid network services, which combine professional mobile radio (Tetra) with commercial and dedicated broadband (LTE) services. Based on this Secure MVNO (Mobile Virtual Network Operator) approach, public safety organisations like the police, rescue services, and the border guard in Finland will gain secure and trusted mobile access to new broadband applications, using for example video and mobile office applications, without compromising the security of their operations. In particular, the Tactilon Suite provides security and asset management and supports secure integration into mobile operator networks. Public safety customers will therefore benefit from ‘multi-network availability’: instead of making separate deals with several network operators, the Tactilon Suite will allow the operator to offer its subscribers a one-stop shop for secure broadband capacity, where each device gets the best available connection.

“Many of our public safety customers are looking for a flexible way to enhance mission critical communications with broadband data. They need mobile broadband solutions that provide them with higher service availability, security and better integration with existing narrowband networks like VIRVE in Finland. The Tactilon Suite is a perfect vehicle for them to combine the best of professional mobile radio and broadband,” said Nicole Lecca, Head of Secure Land Communications at Airbus Defence and Space.

The cooperation between Airbus Defence and Space and the State Security Networks Group on the development of Secure MVNO started in January 2014 with the goal of making mobile broadband available for public safety professionals on a nationwide scale. “That approach will allow Finnish public authorities to use broadband applications and services anywhere in Finland, always using the best available connection or network. Instead of building a new infrastructure, Secure MVNO takes advantage of existing commercial broadband services. This is an essential strategic step towards the future of public safety networks in Finland,”
said Sami Orakoski, CEO of VIRVE Products and Services Ltd, a subsidiary of the State Security Networks Group.

Caption:
The user management tool Tactilon Suite allows the secure integration of public broadband users into the Tetra environment.

About Airbus Defence and Space
Airbus Defence and Space is a division of Airbus Group formed by combining the business activities of Airbus Defence and Space, Astrium and Airbus Military. The new division is Europe’s number one defence and space enterprise, the second largest space business worldwide and among the top ten global defence enterprises. It employs some 38,000 employees generating revenues of approximately €14 billion per year.

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