



NetCore 5G SA (Stand Alone)

Business Benefits

- Delivers profitable, secure, high-speed, private data services
- Scales from small to medium sized installations
- Portable and can be virtualized on a wide range of hardware platforms
- Dedicated mobile network coverage
- Easy-to-use interface for solution management
- Linux based host operating system
- SIP client functionality
- Offers 5G (gNodeB) radio access
- Standards based software insuring interoperability with industry standard gNodeBs

Cost Effective Private Network Solutions

The main purpose of a Private Network (PN) is to connect people, and or things, belonging to an enterprise or organization, located within a small to medium sized geographic area. The main concern is either traditional network technologies are not cost effective to deploy, or data needs to be kept secure and as such must not be sent through a third-party core network like a mobile operator.

A Private Network frees users from the restrictions of conventional connectivity technologies such as Ethernet, which is secure and reliable but is costly and inflexible, and Wi-Fi, which offers a lower cost but also lower reliability. Deployment of a PN will support both human and machine to machine (M2M) communications on a single, reliable network that offers mobility without the cumbersome portable radios, opening to the world of the Internet of Things (IoT).

Key Capabilities

Challenges of Traditional Core Networks

A private network is mostly like a public network. They both use the same underlying network solutions, the same network functions and the same spectrum (this can vary from country to country).

They are however different. Their type of usage is the main difference: public networks are designed and intended for use by the public, with many subscribers on a given nationwide network; a private network is dedicated to the use of a single enterprise or organization, and many times, a single location (as small as a tactical military bubble or as large as a mining facility).

These are usually places with critical infrastructure or mission-critical applications (e.g., military, healthcare, educational, manufacturing facilities, mining, disaster zones, etc.)

NetCore 5G SA, with its 5G Stand Alone Core software, is based on cloud native functions. The user will be able to have data sessions with ultra low latency for critical data services (e.g., drone flight) and even higher data throughputs.

NetCore 5G SA

Less Latency and Higher Speed

A decentralized private network model utilizes the deployment of the mobile network core at the network edge. Each node, which includes AMF, SMF, UPF, UDM, UDR and AUSF, allow devices attached to radio equipments on that node, to communicate with minimal latency.

A Reduced-Footprint Core Network

The NetCore 5G SA software is designed as a reduced-footprint 5GC, which is ideally suited for use in a decentralized network model; using a virtualized, edge of network installation of the core components that integrates with a local platform. This solution offers remote configuration and monitoring of the 5GC components, from a centralized management function.

Reliable data connection

A Private Network frees users from the restrictions of conventional connectivity technologies such as Ethernet (secure and reliable but costly and inflexible) and Wi-Fi (lower cost but lower reliability). It provides a data plane for over-the-top communications (voice, video, messaging, chat, broadcast) or for machine-to-machine information transfer.

Simple Interfaces for Management

Traditional mobile networks are complex and require significant training to operate. This solution is designed differently: all configuration is web-based, intuitive and easy-to-use.

Scalable

Stay agile as your needs change – up or downgrade at any time. The deployment flexibility of NetCore allows it to scale up or down whenever needed.

Easy Installation

NetCore 5G SA is developed to be deployed in a single click installation, making it fast to deploy in all scenarios (e.g., disaster zones or first responders).

Technical Specification

Software 3GPP Compliance

3GPP Rel 16

Operating System

Linux based

CPU Requirements

Intel, AMD (X64-64bit)

GUI Browser

Firefox, Chrome, mobile

Minimum Hardware

Intel i3 0 GHz dual core or equivalent (ARM is not supported), 6GB RAM, 2GB free HDD space, 1x 1Gbit Ethernet NIC

gNodeB Interface

N2 over IP.

gNodeBs*

Laptop/SBC: 5

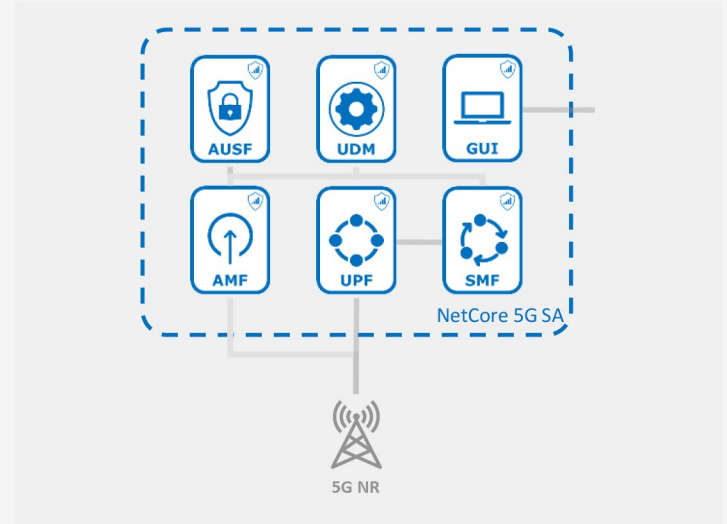
Server: 50

Subscribers*

Laptop/SBC: 100

Server: 10 000

Software Core Elements – 5G SA Architecture



*Data throughput rates and concurrent UE sessions supported are dependent on the performance of the hardware host and the capabilities of the gNodeBs.

Numbers specified are estimated.

To achieve maximum performance the software should be installed on a server with at least 32GB RAM, Intel Xeon Quad Core CPUs and Gigabit Ethernet NICs

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NetCore 5G NSA (Non-Stand Alone)

Business Benefits

- Delivers profitable, secure, high-speed, private data services
- Scales from small to medium sized installations
- Portable and can be virtualized on a wide range of hardware platforms
- Secure, local data access routing
- Easy-to-use interface for management
- Linux based host operating system
- SIP client functionality
- Offers both 4G (eNodeB) and 5G (gNodeB) interfaces for radio access
- Standards based software insuring interoperability with industry standard eNodeBs and gNodeBs

Cost Effective Private Network Solutions

The main purpose of a Private Network (PN) is to connect people, and or things, belonging to an enterprise or organization, located within a small to medium sized geographic area. The main concern is either traditional network technologies are not cost effective to deploy, or data needs to be kept secure and as such must not be sent through a third-party core network like a mobile operator.

A Private Network frees users from the restrictions of conventional connectivity technologies such as Ethernet, which is secure and reliable but is costly and inflexible, and Wi-Fi, which offers a lower cost but also lower reliability. Deployment of a PN will support both human and machine to machine (M2M) communications on a single, reliable network that offers mobility without the cumbersome portable radios, opening to the world of the Internet of Things (IoT).

Key Capabilities

Challenges of a Traditional Centralized EPC Core

In the traditional, carrier-based 5G NSA (Non-Stand Alone) network model, the Evolved Packet Core (EPC) is a centralized, mobile network core including the HSS, MME, PGW, SGW components, plus the PCRF, IMS and management functions, all located in one or more data centers. The radio base stations (eNodeBs and gNodeBs) are located at the network edge, to provide localized cellular coverage but the control plane and user plane data are backhauled to the central EPC components. This architecture requires significant bandwidth between the eNBs/gNBs and the central EPC. The centralized components need to aggregate all the user data, requiring expensive, high-capacity hardware. Communication between devices at the edge of the network, even devices in the same location, incurs latency while the data is backhauled to and transits across the central EPC.

Titan.ium Platform's NetCore 5G NSA

Private Networks: Less Latency with Distributed Performance , Higher Localized Speed and Data Access Efficiency

A decentralized private network model utilizes the deployment of the mobile network core at the network edge. Each node, including the MME, PGW, and SGW components allow devices attached to eNBs and gNBs on that node, to communicate with minimal latency and higher speed than a standard LTE core (expected data rate three times higher than LTE). Other components, which may also include decentralized HSS, PCRF, IMS components, can perform the same function.

A Reduced-Footprint Core

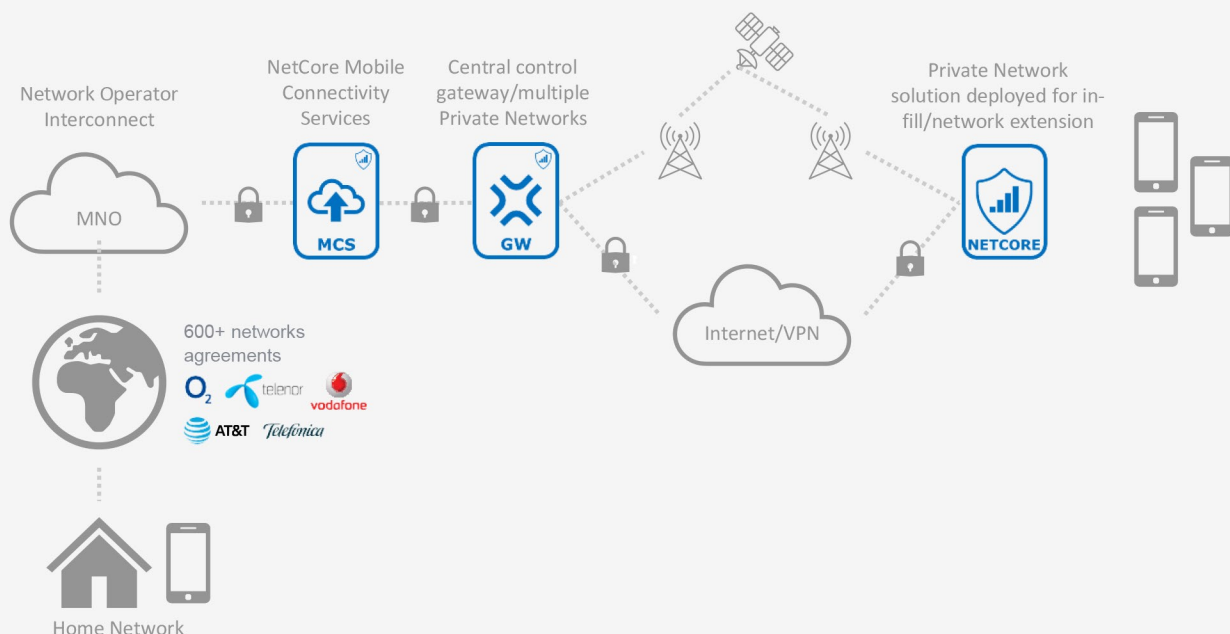
The NetCore 5G NSA software is designed as a reduced-footprint EPC, which is ideally suited for use in a decentralized network model; using a virtualized, edge of network installation of the core components that integrates with a local platform. The NetCore API may be leveraged to facilitate remote configuration and monitoring of the EPC components, from a centralized management function.

Mobile Network Operator Integration

The solution offers both light touch and full integration into a Mobile Network Operator infrastructure which enable both a strategic approach and rapid deployment as required.

How It Works

Private Networks utilizing connection through NetCore and Partner MNOs.



Technical Specification

Software 3GPP Compliance

3GPP Rel 15

Operating System

Linux based

CPU Requirements

Intel, AMD (X64-64bit)

GUI Browser

Firefox, Chrome, IE, Mobile

Minimum Hardware

Intel i3 2.0 GHz dual core or equivalent (ARM is not supported),
3GB RAM, 2GB free HDD space, 1x 100Mbit Ethernet NIC

eNodeB Interface

S1 over IP.

gNodeB Interface

S1-U over IP.

eNodeBs/gNodeBs*

Laptop/SBC: 10

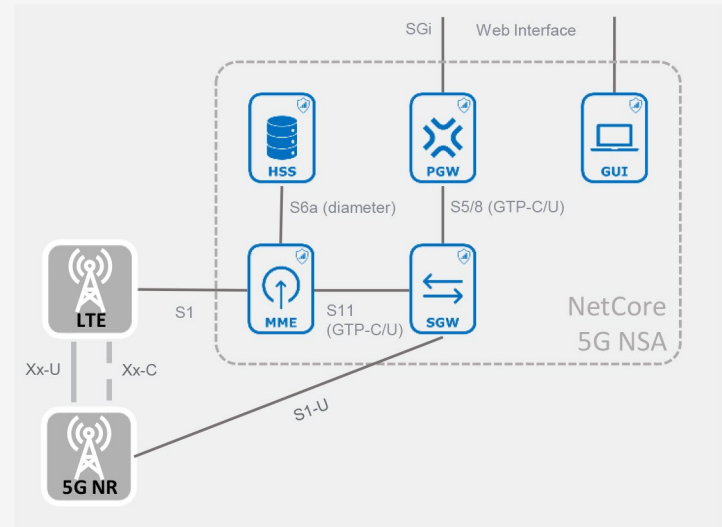
Server: 50

Subscribers*

Laptop/SBC: 100

Server: 1000+

Software Core Elements – 5G NSA 3X Architecture



*Data throughput rates and concurrent UE sessions supported are dependent on the performance of the hardware host and the capabilities of the eNodeBs/gNodeBs.

Numbers specified are estimated.

To achieve maximum performance the software should be installed on a server with at least 32GB RAM, Intel Xeon Quad Core CPUs and Gigabit Ethernet NICs

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NetCore LTE

Business Benefits

- Delivers profitable, secure, high-speed, private data services
- Scales from small to medium sized installations
- Portable and can be virtualized on a wide range of hardware platforms
- Secure, local data access routing
- Simplified operations & maintenance interface
- Linux based host operating system
- SIP client functionality
- Standards based software insuring interoperability with industry standard eNodeBs

Cost Effective Private Network Solutions

The main purpose of a Private Network (PN) is to connect people, and or things, belonging to an enterprise or organization, located within a small to medium sized geographic area. The main concern is either traditional network technologies are not cost effective to deploy, or data needs to be kept secure and as such must not be sent through a third-party core network like a mobile operator.

A Private Network frees users from the restrictions of conventional connectivity technologies such as Ethernet, which is secure and reliable but is costly and inflexible, and Wi-Fi, which offers a lower cost but also lower reliability. Deployment of a PN will support both human and machine to machine (M2M) communications on a single, reliable network that offers mobility without the cumbersome portable radios, opening to the world of the Internet of Things (IoT).

Key Capabilities

Challenges of a Traditional Centralized LTE Network

In the traditional, carrier-based 4G network model, the Evolved Packet Core (EPC) is a centralized, mobile network core including the HSS, MME, PGW, SGW components, plus the PCRF, IMS and management functions, all located in one or more data centers. The radio base stations (eNodeBs) are located at the network edge, to provide localized cellular coverage but the control plane and user plane data are backhauled to the central EPC components. This architecture requires significant bandwidth between the eNodeBs and the central EPC. The centralized components need to aggregate all the user data, requiring expensive, high-capacity hardware. Communication between devices at the edge of the network, even devices in the same location, incurs latency while the data is backhauled to and transits across the central EPC.

NetCore LTE - Private Network Solution

Private Networks: Less Latency with Distributed Performance , Higher Localized Speed and Data Access Efficiency

A decentralized private network model utilizes the deployment of the mobile network core at the network edge. Each node, including the MME, PGW, and SGW components allow devices attached to eNodeBs on that node, to communicate with minimal latency. Other components, which may also include decentralized HSS, PCRF, IMS components can perform the same function.

A Reduced-Footprint EPC

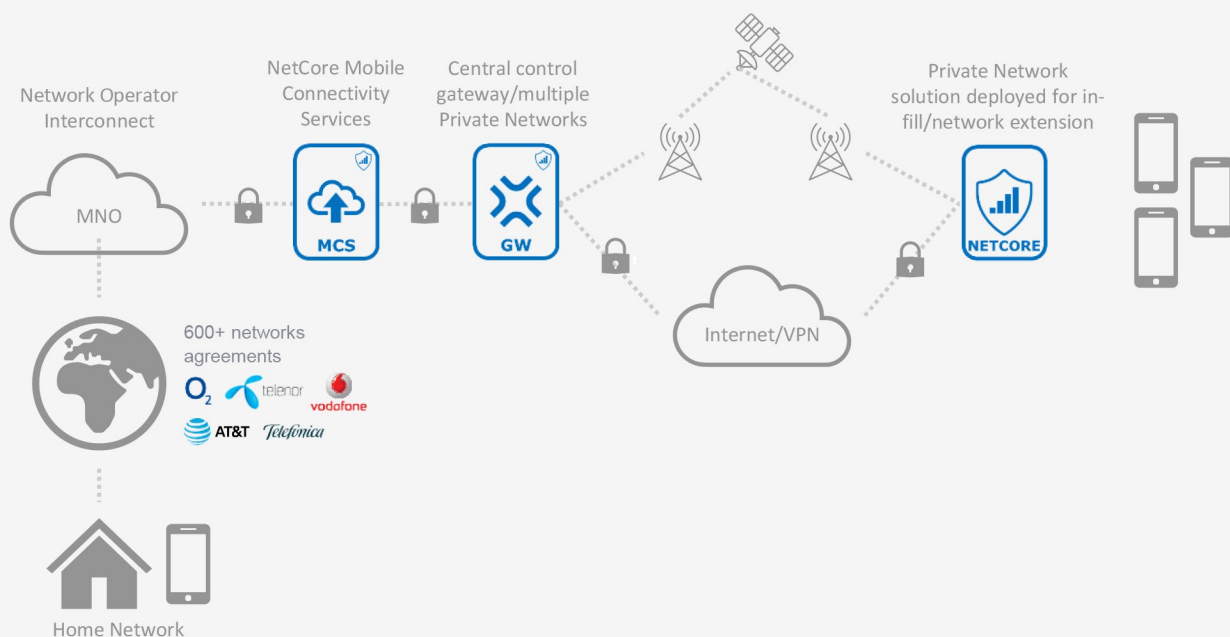
The NetCore software is designed as a reduced-footprint EPC which is ideally suited for use in a decentralized network model that uses a virtualized, edge of network installation of the MME, SGW and PGW components that integrates with a local HSS, PCRF and IMS platform. The NetCore API may be leveraged to facilitate remote configuration and monitoring of the EPC components from a centralized management function.

Mobile Network Operator Integration

The solution offers both light touch and full integration into a Mobile Network Operator infrastructure which enable both a strategic approach and rapid deployment as required.

How It Works

Private Networks utilizing connection through NetCore and Partner MNOs.



Technical Specifications

Software 3GPP Compliance

3GPP Rel 8 (8.9.0)+

Operating System

Linux based

CPU Requirements

Intel, AMD (X64-64bit)

EPC-UI Browser

Firefox, Chrome, IE, Mobile

Minimum Hardware

Intel i3 2.0 GHz dual core or equivalent (ARM is not supported),
3GB RAM, 2GB free HDD space, 1x 100Mbit Ethernet NIC

eNodeB Interface

S1 over IP.

eNodeBs*

Laptop/SBC: 10

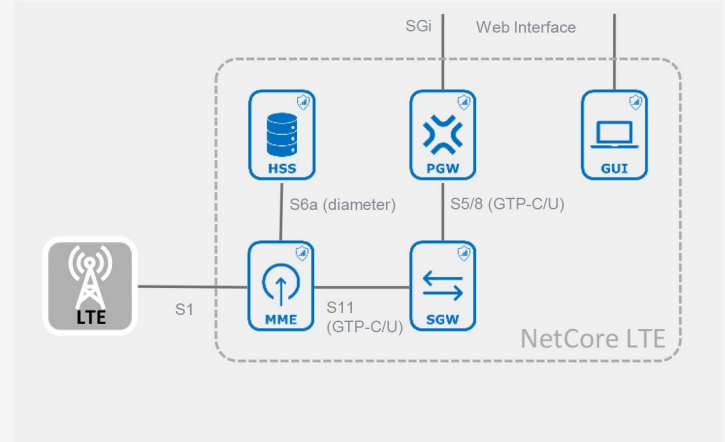
Server: 50

Subscribers*

Laptop/SBC: 100

Server: 1000+

Software Core Elements



*Data throughput rates and concurrent UE sessions supported are dependent on the performance of the hardware host and the capabilities of the eNodeBs/gNodeBs.

Numbers specified are estimated.

To achieve maximum performance the software should be installed on a server with at least 32GB RAM, Intel Xeon Quad Core CPUs and Gigabit Ethernet NICs

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Product Data Sheet



NetCore 3G

Business Benefits

- Delivers profitable, secure and private voice, SMS and data services
- Scales from small to medium sized installations
- Portable and can be virtualized on a wide range of hardware platforms
- Dedicated mobile network coverage
- Easy-to-use interface for solution management
- Linux based host operating system
- SIP client functionality
- Offers 2G (BTS) and 3G (nodeB) radio access
- Standards based software insuring interoperability with industry standard BTSs and NodeBs

Cost Effective Private Network Solutions

The main purpose of a Private Network (PN) is to connect people, and or things, belonging to an enterprise or organization, located within a small to medium sized geographic area. The main concern is either traditional network technologies are not cost effective to deploy, or data needs to be kept secure and as such must not be sent through a third-party core network like a mobile operator.

NetCore 3G is an entirely software-based mobile network solution, optimized for single-board computers and supports scaling up to server-based installations. The software consolidates configuration, monitoring and real-time analytics from a single easy-to-use dashboard.

This converged 2G/3G NetCore software provides the features and functionality of public network operators with the added flexibility of a localized private operation.

NetCore 3G Key Capabilities

Networks Made Easy

Traditional mobile networks are complex and require significant training to operate. This solution is designed differently; all configuration is web-based, intuitive and easy to use.

The NetCore 3G software is designed as a reduced-footprint core network, which is ideally suited for use in a decentralized network model; using a virtualized, edge of network installation of the core components that integrates with a local platform. The NetCore API may be leveraged to facilitate remote configuration and monitoring of the core components, from a centralized management function.

NetCore 3G is highly portable and designed to run on any hardware capable of supporting Linux.

The system is designed to require little or no knowledge of the technology in order to operate and manage commonly changed parameters. Managed through an easy-to-use web interface, these pages are accessible over the LAN with support for common browsers and different device formats.

Solutions

We make it easy to set up and run your own private mobile network for both operational situations and for testing and research purposes.

Lab – Getting the most out of your mobile device, connected sensors or applications - when testing or researching.

Rescue – An instant private cellular network enables first responders to communicate with all mobiles in the affected area.

Flex – The power to create a flexible private cellular network in any situation.

Features and Benefits

Feature	Attribute	Benefit
Simplified Interface	Managed entirely from a web interface providing access to parameters, settings and logging.	<ul style="list-style-type: none">• No need for domain specific knowledge• Easy access via Wi-Fi or LAN
Flexible Deployment	From a man-portable system to a rack-mounted or virtualized solution.	<ul style="list-style-type: none">• Supports a range of hardware platforms• Located at customer or remote site
Subscriber Management	With complete control over who can access the network, administrators can specify individual user services.	<ul style="list-style-type: none">• Simplified provisioning
Full Cellular Comms	Voice, SMS and data functionality Add-on option for in-roaming of 3G subscribers from the public network.	<ul style="list-style-type: none">• Individual and broadcast SMS• GPRS and Edge high speed up to 386kbps, HSDPA up to 14.4Mbps (subject to 3G model)
Local Call Routing	Data is offloaded locally - calls made between registered users can be switched locally.	<ul style="list-style-type: none">• Significant backhaul transport savings
SIP Integration	Integration to the IP PBX over SIP allowing flexible dial plans and call routing.	<ul style="list-style-type: none">• Extension dialing from mobile devices

Technical Specification

Operating System

Linux based

CPU Requirements

Intel, AMD (X64-64bit)

GUI Browser

Firefox, Chrome, Edge, Mobile

Supported Virtual Machines

VMware Workstation, ESXi, VirtualBox, Proxmox

Minimum Hardware

3 GB RAM, Intel i3 2.0 GHz dual core CPU, 3 GB free HDD space, 1 x 100Mbit Ethernet NIC

RAN Interface

Abis over IP, luH over IP

BTS/3GAP

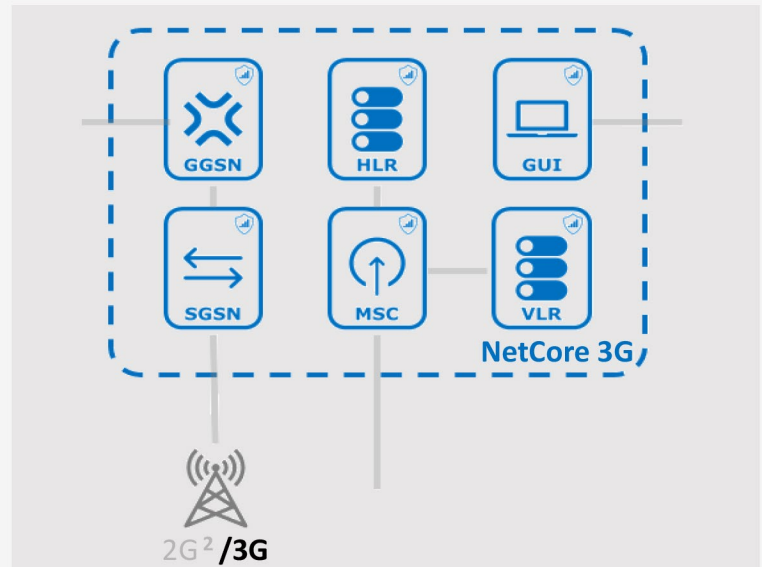
10 (typically)

Subscribers¹

Laptop/SBC: 100s idle

Server: 1000s idle

Software Core Elements Architecture



To achieve maximum performance the software should be installed on a server with at least 32GB RAM, Intel Xeon Quad Core CPUs and Gigabit Ethernet NICs

¹ Data throughput rates and concurrent UE sessions supported are dependent on the performance of the hardware host and the capabilities of the BTS/NodeBs.

Numbers specified are estimated.

² The 2G solutions require specific evaluation to ensure suitability & availability.

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