



## nanoVirt™

Carrier-grade virtualised gateways  
for 3GPP small cell deployments

4G  
SOLUTION

3G  
SOLUTION

2G  
SOLUTION

nanoVirt is a family of 2G, 3G and 4G Gateway and Management products for Small Cell Access Points (APs), running in a virtualised environment



### nanoVirt™ Virtualised Small Cell Gateway

nanoVirt allows the gateway & management components of ip.access' nanoGSM®, nano3G® and nanoLTE® solutions to be deployed in a Virtualised environment, supporting an agnostic server hardware choice.

Eliminating the need for dedicated gateway hardware, nanoVirt allows all small cell gateway and management functions to be installed in a mobile network operator's existing data centre, using the MNO's preferred server hardware to reduce TCO.

For neutral hosts, nanoVirt provides a flexible, scalable gateway solution which can be deployed in third-party data centres or cloud-hosted for ultimate flexibility.

The different technology components of nanoVirt can be deployed separately, or in combinations, to suit the small cell operator's needs and design preferences. Standard reference configurations cover the most typical designs, but ip.access Professional Services are available to support variations as required.

Based on ip.access' field-proven softBSC, nano3G AC (HNB-GW) and nanoLTE GW, which have been successfully deployed by many mobile operators around the world, nanoVirt solutions can be delivered pre-installed on server hardware agreed

with the customer, or deployed into a customer's own environment. For larger systems the solution can be distributed across multiple servers if required.

### Viper™ virtualised enterprise RAN platform

nanoVirt is part of ip.access' Viper end-to-end small cell platform for enterprise RAN, which integrates the following components:

- A range of plug-and-play 2G, 3G and 4G APs for small, medium and large enterprise deployments
- Virtualised Gateways which securely handle and route all traffic between the APs and the operator's core network
- SUMO™ Multi-Operator technology for our range of nanoLTE APs, allowing a single access point to provide coverage for all networks

nanoVirt™ allows operators and neutral hosts to cost-effectively deploy 2G, 3G and 4G small cell management gateways on generic server hardware. This architecture supports over a thousand APs.

### nanoVirt™ components

#### nanoLTE Gateway (GW)

The nanoLTE GW is ip.access' implementation of an HeNB-GW and includes an X2-GW function.

It acts as an aggregator for traffic from nanoLTE 4G Access Points (APs), marshalling and concentrating the signalling and, optionally, data from the APs into a smaller set of links to the Core Network.

The nanoLTE GW connects to the core network using standard S1 interfaces.

#### nano3G Access Controller (AC)

The nano3G AC is ip.access' implementation of an HNB-GW.

It acts as an aggregator for traffic from 3G Access Points (APs), marshalling and concentrating the data from the APs into a smaller set of links to the Core Network.

The nano3G AC connects to the core network using standard lu-CS and lu-PS IP interfaces.

#### 3G/4G Network Orchestration System (NOS)

The NOS provides unified Configuration Management, Fault Management and Performance Management services for ip.access Access Points (3G and 4G), nano3G AC and nanoLTE GW.

It offers both a graphical Client interface, and Northbound interfaces for OSS integration.

#### 2G softBSC & OMC-R

The softBSC is a standards-compliant 2G BSC offering all-IP interfaces to the core network (A/IP and Gb/IP).

The OMC-R is the Management Server for nanoGSM.

#### Virtualised Environment & Supporting Components

##### KVM

The standard deployment assumes an underlying Linux KVM (Kernel-based Virtual Machine) environment, with each application running within a separate VM (Virtual Machine).

Multiple instances can be instantiated across one or more servers for scaling and resilience.

##### IPsec GW

The IPsec Gateway terminates IPsec tunnels from 3G and/or 4G Access Points, allowing secure deployment over Internet paths.

##### nanoVirt Bridge

The nanoVirt Bridge component supports the internal interconnection of the Network Elements and consolidates onto a small number of physical external interfaces.

##### oVirt

oVirt provides simple Orchestration of the VMs containing the Network Elements, including health checks and failovers.

nanoVirt components can be deployed into other virtualised environments (such as VMware) on a case by case basis, supported by ip.access Professional Services.

#### Typical Performance

Reference Configuration	Full 3G Solution
Reference Server	Dell R730
CS traffic - simultaneous	1350 Erlangs
PS data bandwidth	300 Mbps
Transactions	93 transactions / sec
Maximum #APs	Up to 1500 3G APs

