



# Intelligent Fabric delivers application visibility and control for network overlays

## Application note

Intelligent Fabric delivers application visibility and control for network overlays



## Table of contents

Executive summary .....	3
Overlay technologies.....	4
Solution and use cases.....	5

## Executive summary

The adoption of cloud computing is spreading across public and private networks in an effort to get the best possible benefit from shared resources such as servers, storage or networks used by multiple users in a dynamic fashion.

Server virtualisation has increased requirements on the physical infrastructure to support the rapidly growing amount of virtual machines that operate dynamically and on demand while requiring isolation, segmentation and multitenancy.

Virtualised data centres benefit from cloud-like operations to provide seamless workload mobility as a key aspect to ensure business continuity and improved end-user experience.

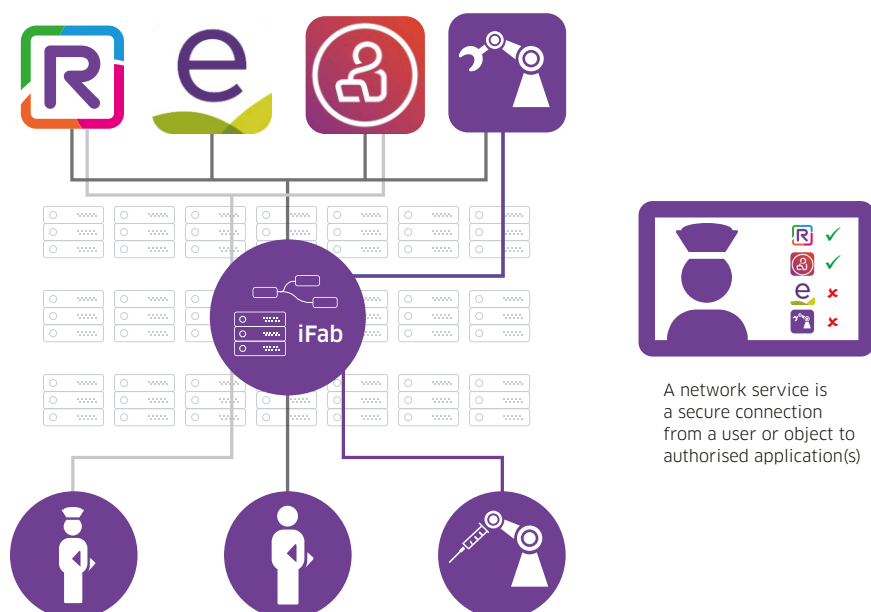
Server virtualisation has improved resource utilisation but enables the ability to move virtual machines (VMs) among data centre servers dynamically without impacting user functionality or availability. However to accomplish the base requirement VMs must always remain in their native IP subnet. Unfortunately, IP subnetting limits the VM mobility domain to the cluster servers that are on identical subnets.

At the same time cloud services are requiring increased network flexibility and agility to support a dynamic multitenant infrastructure. In addition, the network must support the rapidly growing amount of devices to deliver departmental segmentation, business unit isolation and transparent subnet extensions over existing enterprise networks. The traditional 4096 virtual networks supported by IEEE 802.1Q are just not sufficient.

In response to these needs, standards bodies have defined different overlay solutions that virtualise the layer-2 networks encapsulated over IP to carry the tenant traffic transparently over the physical infrastructure, while decoupling the core from the access and the access from the core.

As part of the Autonomous Network architecture, the [Alcatel-Lucent Enterprise Intelligent Fabric \(iFab\)](#) technology is a framework architecture that automates and simplifies the design, deployment and maintenance of elastic standard-based networks. It automates the deployment of the network and simplifies moves, adds and changes while reducing the time and effort it takes to maintain and operate a network. The ALE iFab technology provides overlay network visibility and control including capabilities to seamlessly integrate overlay technologies with legacy technologies in its architecture.

**Figure 1. Intelligent Fabric Framework**



### Application Note

Intelligent Fabric delivers application visibility and control for network overlays

## Overlay technologies

Overlay network technology addresses these challenges and provides immense business agility and scale. It provides business agility by helping IT to seamlessly deploy virtual machines on any virtualised host regardless of the data centres subnetting scheme. This way, the connectivity within the domain can expand beyond hosts and data centre boundaries, over reliable IP infrastructure. Several technologies have emerged for this purpose: Virtual extensible local area network (VXLAN), network virtualisation using generic routing encapsulation (NVGRE) and stateless transport tunneling (STT).

VXLAN, as an overlay technology, removes the need for each virtual resource to be learnt by the network, and it isolates the network from the higher-level forwarding decisions. It provides for scalable multitenant networks that run on top of IP, supporting up to 16 million virtual networks. In essence, it provides for massively scalable virtual networks that operate as long as the underlying IP connectivity is intact.

Even today, after a decade of evolution of server virtualisation, a good percentage of hosts still remain non-virtualised, either because of the need to support legacy applications or because of the lack of incentive to change. This demands the need for the network infrastructure to support the VXLAN gateway functionality that helps virtualise workloads operating in an overlay network environment to communicate with non-virtualised workloads, that is, appliances that connect to traditional virtual LAN (VLAN) based networks.

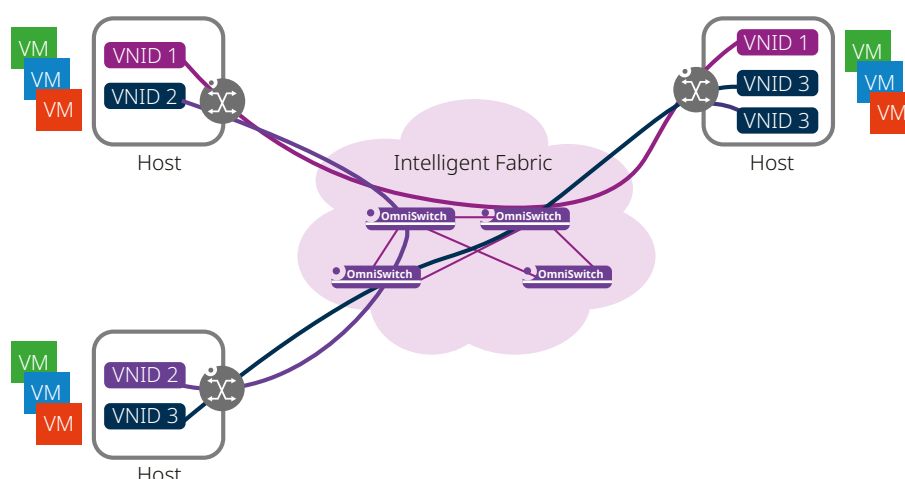
## Solution and use cases

The Alcatel-Lucent OmniSwitch® 6900 platforms support VXLAN gateway capabilities, also referred to as virtual tunnel endpoint (VTEP), enabling a full hardware-based high-performance solution.

The iFab technology enables the virtual machine (VM) snooping capability on the OmniSwitch family, which allows for improved service delivery of overlay networks when transported over the underlying network. The OmniSwitch platform supports visibility and control of virtual tenants identified by the virtual tenant network ID (VNID), providing visibility into individual applications, as well as the capability to apply Quality of Service (QoS) offering differentiated services.

In greenfield data centres where all workloads are virtualised and running as VMs, the individual virtualised hosts provide virtual network creation and binding of workloads to them. For transport, you need an IP infrastructure that not only provides connectivity, but improves business agility by enabling automation through self-configuration and by being programmable through OPEN interfaces as well as application intelligent so that it can provide differentiated services.

Figure 2. Intelligent Fabric in a greenfield data centre

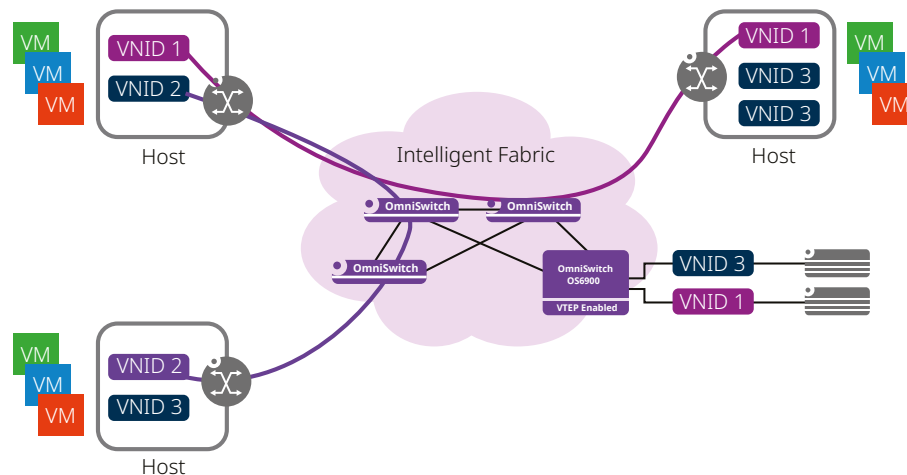


### Application Note

Intelligent Fabric delivers application visibility and control for network overlays

Most of today's data centres have mixed workloads, some virtualised and some non-virtualised. The OmniSwitch 6900 platforms are an ideal choice in this environment, because they enable high performance data centres that connect virtual overlay networks to both traditional physical servers and appliances (such as load balancers and firewalls) acting as the tunnel endpoint on switch interfaces where needed.

**Figure 3. Intelligent Fabric in a mixed workload data centre**



iFab simplifies provisioning and enhances service delivery:

- Capable of dynamic learning of virtual applications inside each VNID
- Automatic discovery of remote VTEPs (in multicast environments)
- Service model architecture provides a flexible scheme to assign traffic to each VNID
- User network profiles can be used to map devices to specific VNIDs, create VNIDs on demand, as well as enforce QoS policies based on VNID
- A full suite of routing protocols and capabilities for routing VXLAN frames between VTEPs
- RESTful interfaces to integrate the OmniSwitch VXLAN gateway into any software-defined networking (SDN) or orchestrated virtualised ecosystem

Network overlay technologies enable the data centre network to transform to a virtualised multitenant network over a shared IP infrastructure that can be consumed for service delivery, enabling flexibility and rapid provisioning. IT can now design and deploy more scalable solutions, going from 4096 virtual networks to 16 million, while allowing applications to seamlessly connect from anywhere with anyone. iFab provides a cost-effective solution where services can be added, moved and expanded without the need for manual configuration of the underlying network infrastructure.

To get more details on these and other advanced capabilities on the OmniSwitch platform, visit [ALE switches](#).