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The Data Networking Technology Ecosystem

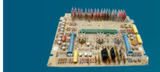
Explore the Evolution of the Technology that Powers Modern Networking

HARDWARE

SOFTWARE

Message Processor (IMP)

1969



Why Was It Invented?
To Connect Computers Over Long Distances

Architecture
Modified Computers

Function
Interface Message Processor

Where Is It Used?
ARPANET

Routers & Switches

1974

Why Was It Invented?
To Make Networks Faster

Architecture
Custom Designed Devices

Function
Router, Firewall, SD-WAN & Switching Equipment

Where Is It Used?
NSP & Corporate Networks

Network Function Virtualization (NFV)

2012

Why Was It Invented?
To Reduce Reliance on Proprietary Equipment

Architecture
Software Emulation of Legacy Hardware Running on Modified Servers

Function
Router, Firewall

Where Is It Used?
NSP, WANaaS & SDCI Networks

Softare Defined Wide Area Network (SD-WAN)

2014

Why Was It Invented?
To Save Money

Architecture
Custom Designed Devices and Software

Function
SD-WAN, Packet Filtering, Routing

Where Is It Used?
Business Networks

White Box NFV

2016

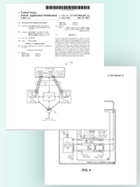
Why Was It Invented?
To Reduce Reliance on Proprietary Equipment

Architecture
Software Emulation of Network Devices Running on Standard Servers

Function
Router

Where Is It Used?
NSP Networks

Stateless Network Functions patent



Microservice Network Function (MNF)

2019

Why Was It Invented?
To Make Data Networks Easier to Create, More Efficient & Reliable

Architecture
Cloud-Native Software Running on Standard Servers

Function
Router, Filtering, Network Address Translation

Where Is It Used?
Data Transport Networks

Virtualized Microservice Network Function (vMNF)

2022

Why Was It Invented?
To Completely Eliminate Hardware Dependency

Architecture
Cloud-Native Software Running on Cloud Compute

Function
Router, Filtering, Network Address Translation

Where Is It Used?
Data Transport Networks

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Networking Technology Comparison Matrix

Each of these networking technologies was created to solve different specific problems and has unique strengths and weaknesses.
Read on to compare these technologies: how they function, their intended use, and the benefits and challenges of each.

	TRADITIONAL DEVICES	**NFV** Network Function Virtualization	**SDCI** Software-Defined Cloud Interconnect	**WHITE BOX NFV**	**SD-WAN** Software-Defined Wide Area Network	**WANasS** Wide Area Network as a Service	**vMNF** Microservice Network Function Virtualization
Description	Networking hardware that fulfills a fixed purpose	Custom servers with VMs running vendor device software	Cloud connectivity managed service	Virtualized network devices operating on generic servers	Purpose-built hardware or software	Managed network connectivity	Microservice-based network function software
Solutions Provided	Routers, Firewalls, SD-WAN, Load Balancers, Switches	Routers, Firewalls	Direct access to hyperscalers and SaaS providers	Routers	Switching of traffic between WAN connections - typically MPLS or Internet	Managed WAN connectivity	Routing, Packet Filtering, Address Translation, Encryption
Architecture	Hardware-based design using fixed ASICs	Vendor software ported to virtualized server environment	Managed network service exchanges	Blend of open source and custom software that creates virtualized routers	Deep Packet Inspection rules based switching system	Managed network access points with connectivity to clouds	Cloud-native software that executes network functions as microservices
Management	Vendor proprietary operating system	Vendor proprietary operating system / server virtualization	Proprietary user interface software	Proprietary vendor software with API	Vendor proprietary out of band system	Proprietary user interface software	Fully API controlled with optional GUI
Strengths	Hardware speed, conventional	Virtualization	Easy to use, semi-automated connectivity to clouds	Software first design, generic hardware	Allows companies to ‘route’ traffic based on policy	Similar to SDCI with additional access options	Create networks on-the-fly, supports in-service upgrades, cloud-like elasticity
Weaknesses	Complicated, rigid, difficult to automate	Expensive, lower performance, more complicated	Connectivity limited to what vendor offers, expensive	Device centric, limited applications, expensive	Requires multiple WANs, cost of equipment can be higher than WAN savings	‘Cloud-washed’ packaging of a managed service	New technology
Vendors	Cisco, Juniper, Palo Alto, Fortinet, F5	Cisco, Juniper, Palo Alto, Fortinet, F5	Packet Fabric, Megaport, Equinix, Cologix	DriveNets Volta Networks	Juniper, Silver Peak, Versa Networks, Fortinet, Barracuda	Alkira, Aviatrix, Kaloom, Volterra	stateless