

D7054 DATACENTER SWITCH



Product Overview

The Inventec D7054 is a high performance 25 GbE Top of Rack (ToR) switch designed for server access in Data centers as well as for Enterprise and Service Provider network deployments.

The switch can be deployed in large scale layer 2 and layer 3 networks. Virtualized, overlay and traditional Enterprise & Data center networks are fully supported.

Today's applications require networks to be Agile, Scalable, Flexible, Reliable, Programmable and Open. The D7054 switch presents an open architecture with high bandwidth and low latency design. It delivers 1.8 Tbps throughput in a compact 1 RU form factor. It offers 48 x 25 GbE + 6 x 100 GbE ports and is a true phyless design.

The SDN switch supports line rate L2/L3 forwarding, programmability, network virtualization, QoS and zero touch provisioning. The D7054 offers customers a compelling choice between a high performance Quad core x 86 or a very powerful Octal Core x 86 CPUs based on functional and operational requirements.

Support for Open Network Ecosystems

The Inventec D7054 is an open switch that supports multiple Network Operating Systems (NOS). Today the switch ships as bare metal but can be integrated with Inventec INOS based on ICOS or SONIC. It also can be integrated with a third party NOS can be integrated on the switch. The switch is SDN enabled. Full ONIE support assures network operators of seamless integration into today's open network environments.

High Performance, Scalable and Flexible

The Inventec D7054 is a high performance switch allowing wire rate of 2.67B packets per second with a

Performance

- 2678 M Packets per Second
- 1.8 Terabits per Second Throughput
- Line Rate L2/L3 Forwarding
- 16 MB Packet Buffer
- 48 x 25 G SFP28 + 6 x 100G QSFP28

Control Plane

- CPU Options
 - 2.0 GHz x 86 Octal-Core*
 - > 8 GB to 16GB DDR4
 - 2.2 GHz x86 Quad-Core
 - > 8 GB DDR4
 - 1.6 GHz x 86 Quad-Core*
 - > 8 GB to 16 GB DDR4
- 16 MB SPI Boot Flash with backup

Scalability

- 136 K MAC Entries (HW Capable)
- 84 K IPv4 Host Routes
- 160 K IPv4 Routes
- 84 K IPv6/64 Routes
- 20 K IPV6/128 Routes
- 64 K Mroutes
- 32 K IPv6 Mroutes
- 4 K VLANs

High Availability

- 1+1 Hot-Swappable and Redundant Power Supply
- 2 x SPI Flash Supports Boot Recovery
- 3 +1 Hot-Swappable and Redundant Fans
- 802.3ad Link Aggregation/LACP
 - 256 Ports/Channel
 - 1024 Groups per System

Flexible Storage

- 8-128 GB SSD for Mass Storage
- 1x USB Port for External Storage



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low cut-through mode latency, 16MB on-chip buffer memory and dynamic buffer management to prevent catastrophic TCP traffic scenarios. The switch offers scalability by supporting choice of high end X86 control processor with upto 16GB of fast DDR4 memory.

With a phyless design, the switch offers a low cut through latency.

The switch is flexible and supports different cabling option as per customer needs. AOC (Active Optical Cabling) and pluggable transceiver optics of different length of fiber connections are supported.

The port use is also flexible. Each QSFP28 100GbE port can be used as 4x25GbE and all SFP28 25GbE ports can be used in 10GbE mode.

The allocated space within the forwarding table is also flexible and can accommodate varying sizes of MAC addresses, Layer 3 host routes and Longest Prefix Match table entries.

Agile, Programmable and supports Analytics

The switch is programmable and supports RESTful API interface. It allows for automatic provisioning and configuration with Puppet, Chef. Zero touch provisioning is also available.

With orchestration tool integration, the switch enables automation and provisioning of L2 and L3 services in the data center.

Lots of valuable analytics can be obtained from the switch by using Agent based Telemetry.

Rich Feature Set

The switch has a rich L2/L3 feature set to address the increase in datacenter network deployments and distributed computing applications. For cloud networking, it includes large L2/L3 switching and forwarding capacity and supports numerous multipathing and tunneling technologies and datacenter

Programmability and Software Support

- Inventec IN-OS
- ONIE
- Open Source Software Provided as RPM
- Chef and Puppet Client Integration
- Zero Touch Provisioning
- Bash Shell

Layer 2

- Dynamic ARP
- Jumbo Ethernet Frames (up to 9416 bytes)
- Storm Control
 - Broadcast, Unknown
 - Unicast/Multicast
- STP
 - Rapid Spanning Tree (802.1w)
 - Multiple Spanning Tree (802.1s)
- VLAN
 - IEEE 802.1Q tagged based
 - Q in Q VLAN (802.1ad)
 - Private VLAN
- LLDP (802.1ab)
- Link Aggregation
 - 802.3ad with LACP
 - Virtual Port Channel
- Snooping
 - IGMP v1/v2/v3, DHCP, DHCPv6, MLDv1/v2

Layer 3

- Address Resolution Protocol (ARP)
- IGMP v2/v3
- Internet Control Message Protocol (ICMP v4/v6)
- IPv6 (ICMP, OSPF v3, BGP, MLD)
- Open Shortest Path First (OSPF v2/v3)
- PIM-SM, PIM-SSM, PIM-BIDR, PIM-DM
- Policy Based Routing
- Static route
- Virtual Router Redundancy Protocol (VRRP)
- Border Gateway Protocol (BGP), Multi-protocol Extensions for BGP-4 (MP-BGP)
- Equal Cost Multipath (ECMP) (128-way)

features like ECMP, VXLAN and NVGRE.

These overlays allow for network agility since the network operators do not have to modify the physical switch devices in case a user VM moves from one rack to another within the datacenter.

Available and Reliable Design

The switch is datacenter optimized with power and fan redundancy. It has a backup SPI boot flash that will activate for boot recovery if primary flash is corrupted. Also, with a Phy less switch, the overall MTBF increases with less number of hardware components.

Applications

- Datacenter ToR Switch
- Enterprise Campus Switch
- Service Provider general purpose switch

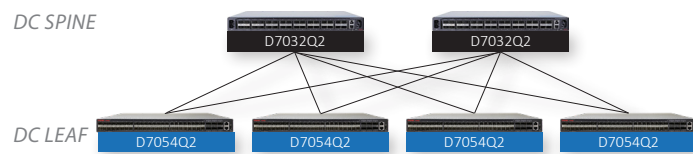


Figure 1. Inventec Switches in a Leaf-Spine DC Architecture

In Summary

Overall performance, feature-richness, high availability, programmability, port-density, and line-rate switching capability makes the D7054 an excellent choice for next generation large and medium sized datacenters. This also makes the D7054 well suited for use as a general purpose switch in the Enterprise and Service Provider networks.

QoS

- 802.1p, IP Precedence and DSCP Based Classifications
- Differentiated Services
- Rate limiting
- Strict Priority Queueing
- Traffic Shaping
- Up to 20 Queues per Port
- WRED

Network Management and Monitoring

- CLI
- Telnet/SSH
- TFTP/Xmodem/FTP
- IPv6 Management
- Port Mirroring
- sFlow

Security

- AAA (Accounting and Authorization)
- ACL Logging and Mirroring
- DHCP Snooping
- DOS Protection
- Ingress/Egress L2/L3/L4 ACL
- IP Source Guard
- Management IP Filtering (SNMP/Telnet/SSH)
- Port MAC Locking
- Protected Ports
- Static MAC Filtering
- RADIUS
- TACACS+

Datacenter

- Priority-based Flow control (802.1Qbb)
- Enhanced Transmission Selection (802.1Qaz)
- Data Center Bridging Protocol (802.1Qaz)
- Quantized Congestion Notification (802.1Qau)
- L2 in L3 Tunneling (VxLAN/L2GRE/NVGRE)
- OpenFlow Switch Specification 1.3

Category	Description	Specification
Physical	Form Factor	1 RU Fixed
	Dimensions (D x H x W)	482.6 x 43.18 x 449.1 mm (19 x 1.70 x 17.68 inch)
	Weight	10 kg (22 lbs)
	Interfaces	48 x 25 GbE SFP28 + 6x 100 GbE QSFP28
	Power Supplies	2 (1+1) Hot-Swappable and Redundant
	Power Connector	IEC320-C13
	Fans	4 (3+1) Hot-Swappable and Redundant
	System Memory	8 GB-16 GB
	Flash Storage	8-128 GB
	External I/O	1x USB
	MGMT Port	1x GE RJ-45
	Console Port	1x RJ-45 (RS-232)
	Reset	1x Reset Button (Front Panel Mounted)
	Status LEDs	System Health Status/Fan Status
	Activity LEDs	Link Activity/Status
Optics and Cables	QSFP28	See Section Supported Optics and Cables
Performance and Scalability	Forwarding	2678 Mpps
	Throughput	1.8 TB per Second Bi-directional
	Latency	500 nanosecond
	Layer 2	136 K Mac addresses, 4 K Vlans
	Layer 3	84 K IPv4 host routes, 160 K IPv4/84 K IPv6 routes, 64 K IPv4/32 K IPv6 Mroutes
	Redundancy	256 x 802.3ad groups; 128-way ECMP
	Buffer	16 MB
	Memory	8 GB
Power	Type	AC
	Input Voltage	100 Vac~240 Vac
	Input Frequency	50/60 Hz
	Typical/Max Power Draw	228 W/255 W
Cooling	Front to Back Airflow	Yes
	Back to Front Airflow	No
Environmental	Operating Temperature	0~50 °C
	Storage Temperature	-40~70 °C
	Relative Humidity	10~90 %
	Altitude	0~3000 m(0~10,000 ft)
Compliance	EMI	CISPR-22/FCC Part 15 IEC61000-3-2/3 IEC61000-4-2/3/4/5/6/11
	Safety	CB: IEC60950-1 (2nd) CCC: GB 4943.1-2011
	RoHS	RoHS-6

Supported Optics & Cables

Speed	P/N	Type	Description
25 G	LOHQF006-SD-R	DAC	0.5 m SFP28
	MCP2M00-AXXX	DAC	0.5~3 m SFP28
	RTXM330-003	AOC	3 m SFP28 AOC
	RTXM330-030	AOC	30 m SFP28 AOC
	MFA2P10-A005	AOC	5 m SFP28 AOC
	FCBG125SD1C05 or FCCG125SD1C05	AOC	5 m SFP28 AOC
	FCBG125SD1C30 or FCCG125SD1C30	AOC	30 m SFP28 AOC
	FTLF1436P3BCL	LR	LC type DFB 2km
	FTLF8536P4BCL	SR	LC type VCSEL laser
100 G	RTXM420-550	SR4	MPO type 70 m OM3,100 m OM4
	RTXM420-551	eSR4	MPO type 210 m OM3,300 m OM4
	FTLC9551REPM	SR4	MPO type
	FTLC1151RDPL	LR4	LC type 10 km SMF
	FTLC1152RGPL	CWDM4	LC type 2 km SMF
	LQ210PR-Oxxx	PSM4	MPO type 2 km
	MMA1B00-C100D	SR4	MPO type 100 m
	NDAQGF-0001	Fanout	1 m fanout 25 G 30 AWG
	LOHQF004-SD-R	Fanout	3 m fanout 25 G 26 AWG

ABOUT INVENTEC

Inventec Enterprise Business Group (EBG) was established in 1998 and has been focusing on the design and manufacturing of server systems. Inventec EBG is the key server system supplier of the global branding clients.

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* Standards and RFC Compliance

ANSI/TIA-1057	LLDP-MED	RFC 3021	Using 31 -Bit Prefixes on IPv4 Point-to-Point Links
IEEE 802.1AB	Link level discovery protocol	RFC 3046	DHCP/BOOTP relay
IEEE 802.1D	Spanning tree	RFC 3056	Connection of IPv6 Domains via IPv4 Clouds
IEEE 802.1p	Ethernet priority with user provisioning and mapping	RFC 3101	The OSPF "Not So Stubby Area" (NSSA) option
IEEE 802.1Q	Virtual LANs w/ port-based VLANs	RFC 3137	OSPF Stub Router Advertisement
IEEE 802.1S	Multiple spanning tree	RFC 3246	An expedited forwarding PHB (Per-Hop Behavior)
IEEE 802.1W	Rapid spanning tree	RFC 3260	New terminology and clarifications for DiffServ
IEEE 802.1X	Port-based authentication	RFC 3315	Dynamic Host Configuration Protocol for IPv6 (DHCPv6)
IEEE 802.3ac	VLAN tagging	RFC 3376	IGMPv3
IEEE 802.3ad	Link aggregation	RFC 3484	Default Address Selection for IPv6
IEEE 802.3x	Flow control	RFC 3493	Basic Socket Interface for IPv6
IETF	DRAFT-idmr-dvmrp-v3-10 — DVMRP	RFC 3513	Addressing Architecture for IPv6
IETF	DRAFT-magma-igmp-proxy-06.txt — IGMP/MLD-based multicast forwarding (IGMP/MLD proxying)	RFC 3542	Advanced Sockets API for IPv6
IETF	DRAFT-magma-igmpv3-and-routing-05.txt — IGMPv3 and multicast routing protocol interaction	RFC 3587	IPv6 Global Unicast Address Format
RFC 1112	Host extensions for IP multicasting	RFC 3623	Graceful OSPF Restart
RFC 1256	ICMP router discovery messages	RFC 3633	IPv6 Prefix Options for Dynamic Host Configuration Protocol (DHCP) version 6
RFC 1321	Message digest algorithm	RFC 3736	Stateless DHCPv6
RFC 1519	CIDR	RFC 3768	Virtual Router Redundancy Protocol (VRRP)
RFC 1765	OSPF database overflow	RFC 4213	Basic Transition Mechanisms for IPv6
RFC 1812	Requirements for IPv4 routers	RFC 4271	A Border Gateway Protocol 4 (BGP-4)
RFC 1981	Path MTU for IPv6	RFC 4291	Addressing Architecture for IPv6
RFC 1997	BGP Communities Attribute	RFC 4443	ICMPv6
RFC 2131	DHCP relay	RFC 4456	BGP Route Reflectors
RFC 2236	IGMP v2	RFC 4486	Subcodes for BGP Cease Notification Message
RFC 2328	OSPFv2	RFC 4541	IGMP snooping
RFC 2365	Administratively scoped boundaries	RFC 4760	Multiprotocol Extensions for BGP-4
RFC 2370	The OSPF Opaque LSA Option	RFC 5171	Unidirectional Link Detection (UDLD) Protocol
RFC 2385	Protection of BGP Sessions via the TCP MD5 Signature Option	RFC 5340	OSPF for IPv6
RFC 2460	IPv6 Protocol Specification	RFC 5492	Capabilities Advertisement with BGP-4
RFC 2461	Neighbor Discovery	RFC 6164	Using 127-Bit IPv6 Prefixes on Inter-Router Links
RFC 2462	Stateless Autoconfiguration	RFC 6583	Operational Neighbor Discovery Problems
RFC 2464	IPv6 over Ethernet	RFC 6860	Hiding Transit-Only networks in OSPF
RFC 2474	Definition of the differentiated services field (DS Field) in the IPv4 and IPv6 headers	RFC 826	Ethernet ARP
RFC 2475	An architecture for differentiated services	RFC 894	Transmission of IP datagrams over Ethernet networks
RFC 2545	BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing	RFC 896	Congestion control in IP/TCP networks
RFC 2597	Assured forwarding PHB group	RFC3810	MLDv2
RFC 2710	MLDv1	RFC3973	PIM-DM
RFC 2711	IPv6 Router Alert	RFC4601	PIM-SM
RFC 2918	Route Refresh Capability for BGP-4		

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