

## D7332 DATACENTER SWITCH



### Product Overview

The Inventec D7332 is a high-performance network switching device supporting up to 32 x 400GbE, or 64 x 200GbE, or 128 x 100GbE switch ports. It is designed to address performance, capacity and service requirements for next-generation data center and cloud computing environments.

As server interfaces transition to higher Ethernet speeds and virtualization continues to increase link utilization, data center networks are demanding switches with 100GbE and 400GbE connectivity at the edge and aggregation layers.

The D7332 provides scalable, cost effective aggregation, spine and leaf switching for the data center.

The SDN Switch supports line rate L2/L3 forwarding, network virtualization, QoS and zero touch provisioning.

The D7332 offers customers a compelling choice between a high-performance Quad core x86 or a very powerful Octal Core x86 CPUs based on functional and operational requirements.

### Support for Open Network Ecosystems

The Inventec D7332 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 can also be integrated with a third party NOS. 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 D7332 is a high performance switch allowing wire rate of 8B packets per second with a low cut-through mode latency, 132 MB on-chip buffer memory and dynamic buffer management. The switch offers scalability by supporting choice of high end X86 control processor with up to 32 GB of fast DDR4 memory. With a PHY less design, the switch offers low cut through latency.

### Performance

- Broadcom BCM56980 Tomahawk3 advance programmable ASIC
- 8B Packets Per Seconds line rate  
12.8 Terabits per Second Throughput
- Line Rate L2/L3 Forwarding
- Integrated high-performance 132MB SmartBuffer memory for maximum burst absorption and service guarantees
- 32x400 GbE QSFP-DD

### Control Plane

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

### Scalability

- 8K MAC Entries (HW Capable)
- 16K L3 IPv4 Hosts
- 8K L3 IPv6 Hosts
- 32K Mroutes
- 512 L3 Multicast groups
- 4K VLANs

### High Availability

- 1 + 1 Hot-Swappable & Redundant Power Supply
- 2 x SPI Flash Supports Boot Recovery
- 5 + 1 Hot-Swappable & Redundant Fans
- 802.3ad Link Aggregation/LACP
- 4096 ECMP groups
- 4k max members per group

### Flexible Storage

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



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The switch is flexible and supports different cabling options as per customer needs. AOC (Active Optical Cabling) and pluggable transceiver optics of different lengths of fiber connections are supported. The port use is also flexible. Each 400GbE port can be used as 4x100 GbE, or 2x200 GbE.

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 or In-band Network 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 & forwarding capacity and supports numerous multipathing and tunneling technologies and datacenter 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.

### Secure, Available and Reliable Design

The switch supports Trusted Platform Module (TPM) with Secure Boot. TPM allows integrity of the switch platform. Along with Secure boot, it allows a chain of trust from power ON till the OS is up and running. 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.

### Programmability and Software Support

- Inventec INOS
- ONIE
- 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, MLD v1/v2

### Layer 3

- Address Resolution Protocol (ARP)
- IGMP v2/v
- 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)

## Applications

- Datacenter ToR Switch
- Enterprise Campus Switch

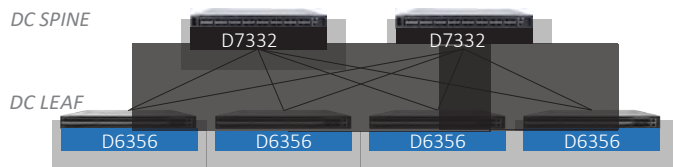


Figure 1. Inventec Switches in a Leaf-Spine DC Architecture

## In Summary

Overall performance, feature-richness, high availability, programmability, port-density, and line-rate switching capability makes the D7332 an excellent choice for next generation large and medium sized datacenters. This also makes the D7332 well suited for use as a campus switch in the Enterprise.

## QoS

- 802.1p, IP Precedence and DSCP Based Classifications
- Differentiated Services
- Rate limiting
- Strict Priority Queueing
- Traffic Shaping
- Up to 12 Queues per Port
- WRED

## Network Management and Monitoring

- CLI
- Telnet/SSH
- TFTP/Xmodem/FTP
- IPv6 Management
- Port Mirroring
- sFlow
- USB Port
- 1G Management ports

## Security

- Hardware based Trusted Platform Module
- Implements Secure boot
- 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)
- Quantized Congestion Notification (802.1Qau)
- L2 in L3 Tunneling (VxLAN/L2 GRE/NVGRE)
- OpenFlow Switch Specification 1.3



Category	Description	Specification
Physical	Form Factor	1RU Fixed
	Dimensions (D x W x H)	549.9D x 440W x 43.18H mm (21.65D x 17.32W x 1.7H inches)
	Weight	10 kg (22lbs)
	Interfaces	32 x 400 GbE QSFP-DD or 64 x 200 GbE or 128 x 100 GbE
	Power Supplies	2 (1+1) Hot swappable & Redundant
	Power Connector	IEC320-C13
	Fans	6 (5+1) Hot-Swappable & Redundant
	System Memory	8 GB-16 GB
	Flash Storage	8-128 GB
	External I/O	1 x USB
	MGMT Port	1 x GE RJ-45
	Console Port	1 x RJ45 (RS-232)
	Reset	1 x Reset Button (Front Panel Mounted)
	Status LEDs	System Health Status/ Fan Status
	Activity LEDs	Link Activity/ Status
Optics and Cables		See Section "Supported Optics and Cables"
Performance and Scalability	Forwarding	8 Bpps
	Throughput	25.6 Tbps Bi-directional
	Latency	Average 500 ns
	Layer 2	8K Mac addresses, 4K Vlans
	Layer 3	16K IPv4 hosts, 8K IPv6 hosts
	Redundancy	256 x 802.3ad groups; 128-way ECMP
	Buffer	64 MB Maximum
	Memory	8 GB
Power	Type	AC
	Input Voltage	100~240 VAC
	Input Frequency	50/60 Hz
	Typical/Max Power Draw	630 W/ 1300 W
Cooling	Front to Back Airflow	Yes
	Back to Front Airflow	Yes
Environmental	Operating Temperature	0~40 ° 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
	Security	Supports Trusted Platform Module with Secure Boot

## Supported Optics & Cables

Speed

P/N

TBD

TBD

## 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

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

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