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
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 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 multi-pathing 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

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

<table>
<thead>
<tr>
<th>Physical</th>
<th>Form Factor</th>
<th>1RU Fixed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dimensions (D x W x H)</td>
<td>549.9D x 440W x 43.18H mm (21.65D x 17.32W x 1.7H inches)</td>
</tr>
<tr>
<td></td>
<td>Weight</td>
<td>10 kg (22lbs)</td>
</tr>
<tr>
<td></td>
<td>Interfaces</td>
<td>32 x 400 GbE QSFP-DD or 64 x 200 GbE or 128 x 100 GbE</td>
</tr>
<tr>
<td></td>
<td>Power Supplies</td>
<td>2 (1+1) Hot swappable &amp; Redundant</td>
</tr>
<tr>
<td></td>
<td>Power Connector</td>
<td>IEC320-C13</td>
</tr>
<tr>
<td></td>
<td>Fans</td>
<td>6 (5+1) Hot-Swappable &amp; Redundant</td>
</tr>
<tr>
<td></td>
<td>System Memory</td>
<td>8 GB-16 GB</td>
</tr>
<tr>
<td></td>
<td>Flash Storage</td>
<td>8-128 GB</td>
</tr>
<tr>
<td></td>
<td>External I/O</td>
<td>1 x USB</td>
</tr>
<tr>
<td></td>
<td>MGMT Port</td>
<td>1 x GE RJ-45</td>
</tr>
<tr>
<td></td>
<td>Console Port</td>
<td>1 x RS45 (RS-232)</td>
</tr>
<tr>
<td></td>
<td>Reset</td>
<td>1 x Reset Button (Front Panel Mounted)</td>
</tr>
<tr>
<td></td>
<td>Status LEDs</td>
<td>System Health Status/ Fan Status</td>
</tr>
<tr>
<td></td>
<td>Activity LEDs</td>
<td>Link Activity/ Status</td>
</tr>
</tbody>
</table>

| 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

<table>
<thead>
<tr>
<th>Speed</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBD</td>
<td>TBD</td>
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</tbody>
</table>
* Standards and RFC Compliance

RFC 1112  Host extensions for IP multicasting
RFC 1256  ICMP router discovery messages
RFC 1321  Message digest algorithm
RFC 1519  CIDs
RFC 1765  OSPF database overflow
RFC 1812  Requirements for IPv4 routers
RFC 1981  Path MTU for IPv6
RFC 1997  BGP Communities Attribute
RFC 2131  DHCP relay
RFC 2236  IGMP v2
RFC 2328  OSPFv2
RFC 2365  Administratively scoped boundaries
RFC 2370  The OSPFOpaque LSA Option
RFC 2385  Protection of BGP Sessions via the TCP MDS
RFC 2460  Signature Option
RFC 2461  IPv6 Protocol Specification
RFC 2462  Neighbor Discovery
RFC 2463  Stateless Autoconfiguration
RFC 2464  IPv6 over Ethernet
RFC 2474  Definition of the differentiated services field (DS Field) in the IPv4 and IPv6 headers
RFC 2475  An architecture for differentiated services
RFC 2545  BGP-4 Multiprotocol Extensions for IPv6
RFC 2597  Inter-Domain Routing
RFC 2710  Assured forwarding PHB group
RFC 2711  IPv6 Router Alert
RFC 2918  Route Refresh Capability for BGP-4
RFC 3021  Using 31-Bit Prefixes on IPv4 Point-to-Point Links
RFC 3046  DHCP/BOOTP relay
RFC 3056  Connection of IPv6 Domains via IPv4 Clouds
RFC 3101  The OSPF “Not So Stubby Area” (NSSA) option
RFC 3137  OSPF Stub Router Advertisement
RFC 3246  An expedited forwarding PHB (Per-Hop Behavior)
RFC 3260  New terminology and clarifications for DiffServ
RFC 3315  Dynamic Host Configuration Protocol for IPv6 (DHCPv6)
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

RFC 4271  A Border Gateway Protocol 4 (BGP-4)
RFC 4291  Addressing Architecture for IPv6
RFC 4443  ICMPv6
RFC 4456  BGP Route Reflectors
RFC 4486  Subcodes for BGP Cease Notification Message
RFC 4541  IGMP snooping
RFC 4760  Multiprotocol Extensions for BGP-4
RFC 5171  Unidirectional Link Detection (UDLD) Protocol
RFC 5340  OSPF for IPv6
RFC 5492  Capabilities Advertisement with BGP-4
RFC 5644  Using 127-Bit IPv6 Prefixes on Inter-Router Links
RFC 6583  Operational Neighbor Discovery Problems
RFC 6860  Hiding Transit-Only networks in OSPF
RFC 826  Ethernet ARP
RFC 896  Transmission of IP datagrams over Ethernet networks
RFC 896  Congestion control in IP/TCP networks
RFC 3810  MED
RFC 3973  PIM-DM
RFC 4601  PIM-SM
ANSI/TIA-1057  LLDMP-MED
Draft-ietf-idmr-dvmpv3-03.txt  DVMRP
Draft-ietf-magma-igmp-proxy-06.txt  IGMP/MLD-based multicast forwarding (IGMP/MLD proxying)
Draft-ietf-magma-igmpv3-and-routing-05.txt  IGMPv3 and multicast routing protocol interaction
IEEE 802.1AB  Link level discovery protocol
IEEE 802.1D  Spanning tree
IEEE 802.1p  Ethernet priority with user provisioning and mapping
IEEE 802.1Q  Virtual LANs w/ port-based VLANs
IEEE 802.1s  Multiple spanning tree
IEEE 802.1w  Rapid spanning tree
IEEE 802.1x  Port-based authentication
IEEE 802.3ac  VLAN tagging
IEEE 802.3ad  Link aggregation
IEEE 802.3x  Flow control

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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