Inventec

Open, Standard and Programmable Network for All

D6356
DATACENTER SWITCH

Product Overview

The Inventec D6356 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, Secure and Open.

The D6356 switch presents an open architecture with high bandwidth and low latency design. It delivers 2Tbps throughput in a compact 1RU form factor. It offers 48x25 GbE + 8x100GbE ports.

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

The D6356 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 D6356 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 D6356 is a high performance switch allowing wire rate of 2B packets per second with a low cut-through mode latency, 32 MB on-chip buffer memory and dynamic buffer management. The switch offers scalability by supporting choice of high end X86 control processor with upto 16 GB of fast DDR4 memory. With a PHY less design,

Performance

- 2B Packets per Second line rate
- 2.0 Terabits per Second Throughput
- Line Rate Forwarding @ 251 bytes
- 32MB Packet Buffer
- 48x25 G SFP28+8x100 G QSFP28

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

- 288K MAC Entries (HW Capable)
- 168K L3 IPv4 Host Routes
- 100K L3 IPv6 Host Routes
- 324K IPv4 L3 LPM without uRPF
- 168K IPv6/64 LPM without uRPF
- 40K IPv6/128 LPM without uRPF
- 64K Mroutes
- 16K L3 Multicast groups
- 4K VLANs

High Availability

- 1 + 1 Hot-Swappable & Redundant Power Supply
- 2 x SPI Flash Supports Boot Recovery
- 3 + 1 Hot-Swappable & Redundant Fans
- 802.3ad Link Aggregation/LACP
- 4096 ECMP groups
- 1024 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 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 4x25 GbE and all SFP28 25 GbE ports can be used in 10 GbE 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 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/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)

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Applications

- Datacenter ToR Switch
- Enterprise Campus Switch

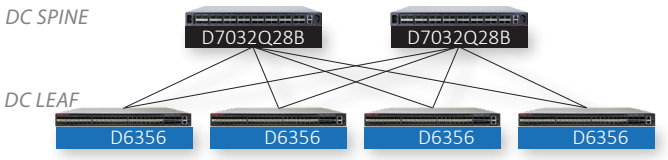

Figure 1. Inventec Switches in a Leaf-Spine DC Architecture

In Summary

Overall performance, feature-richness, high availability, programmability, port-density, and line-rate switching capability makes the D6356 an excellent choice for next generation large and medium sized datacenters. This also makes the D6356 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 20 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

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Category	Description	Specification
Physical	Form Factor	1RU Fixed
	Dimensions (D x W x H)	482.6D x 440W x 43.18H mm (19D x 17.32W x 1.7H inches)
	Weight	10 kg (22lbs)
	Interfaces	48 x 25 GbE SFP28 + 8 x 100 GbE QSFP28
	Power Supplies	2 (1+1) Hot swappable & Redundant
	Power Connector	IEC320-C13
	Fans	4 (3+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	2 Bpps
	Throughput	2.0 Tbps Bi-directional
	Latency	500 ns
	Layer 2	136K Mac addresses, 4K Vlans
	Layer 3	84K IPv4 host routes, 160K IPv4/84K IPv6 routes, 64K IPv4/32K IPv6 Mroutes
	Redundancy	256 x 802.3ad groups; 128-way ECMP
	Buffer	32 MB
	Memory	8 GB
Power	Type	AC
	Input Voltage	100~240 VAC
	Input Frequency	50/60 Hz
	Typical/Max Power Draw	630 W/ 750 W
Cooling	Front to Back Airflow	Yes
	Back to Front Airflow	Yes
Environmental	Operating Temperature	0~45 ° 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

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Supported Optics & Cables

Speed	P/N	Type	Description
25G	L0HQF006-SD-R	DAC	0.5m SFP28
	MCP2M00-AXXX	DAC	0.5~3m SFP28
	RTXM330-003	AOC	3m SFP28 AOC
	RTXM330-030	AOC	30m SFP28 AOC
	MFA2P10-A005	AOC	5m SFP28 AOC
	FCBG125SD1C05 or FCCG125SD1C05	AOC	5m SFP28 AOC
	FCBG125SD1C30 or FCCG125SD1C30	AOC	30m SFP28 AOC
	FTLF8536P4BCL	SR	LC type VCSEL laser
100G	RTXM420-550	SR4	MPO type 70m OM3,100m OM4
	FTLC9551REPM	SR4	MPO type
	FTLC1151RDPL	LR4	LC type 10km SMF
	FTLC1152RGPL	CWDM4	LC type 2km SMF
	LQ210PR-Oxxx	PSM4	MPO type 2km
	NDAQGF-0001	Fanout	1m fanout 25G 30AWG
	L0HQF004-SD-R	Fanout	3m fanout 25G 26AWG

* Standards and RFC Compliance

RFC 1112	Host extensions for IP multicasting
RFC 1256	ICMP router discovery messages
RFC 1321	Message digest algorithm
RFC 1519	CIDR
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 OSPF Opaque LSA Option
RFC 2385	Protection of BGP Sessions via the TCP MD5 Signature Option
RFC 2460	IPv6 Protocol Specification
RFC 2461	Neighbor Discovery
RFC 2462	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 Inter-Domain Routing
RFC 2597	Assured forwarding PHB group
RFC 2710	MLDv1
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 6164	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 894	Transmission of IP datagrams over Ethernet networks
RFC 896	Congestion control in IP/TCP networks
RFC3810	MLDv2
RFC3973	PIM-DM
RFC4601	PIM-SM
ANSI/TIA-1057	LLDP-MED
Draft-ietf-idmr-dvmrp-v3-10	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

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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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