Centec V350 Product Introduction

Centec Networks (Suzhou) Co. Ltd

R1.6 2016-03




V350 Win the SDN Idol@ONS

- **V350 win the SDN Idol@ONS award in ONS 2013**

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Agenda

- **Centec Product Introduction: Silicon & V350**
- **V350 Product Details**
- **V350 Case Studies**

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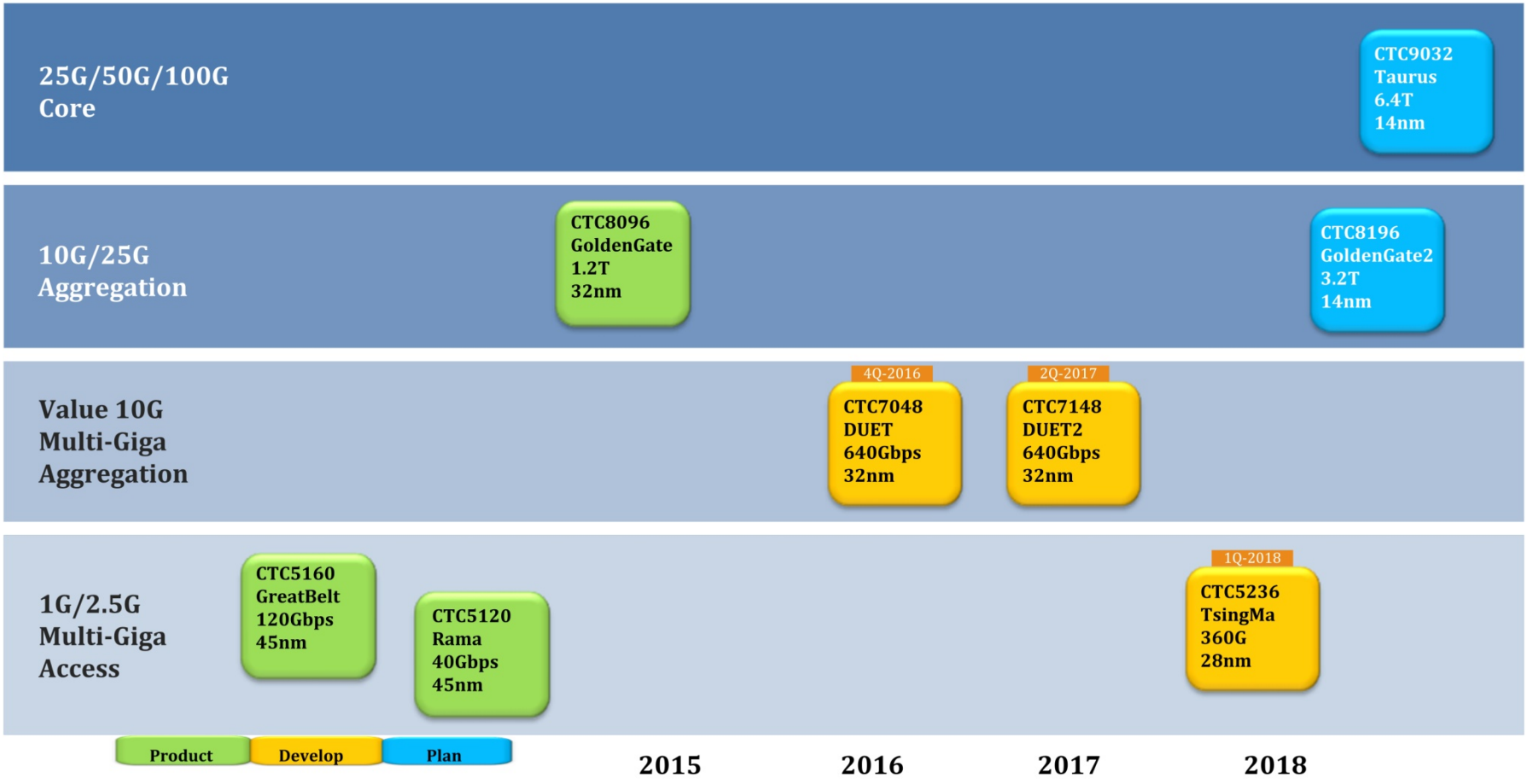
Roadmap

FULL Lineup from Access to Core



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GreatBelt Series Overview

- **High feature, high performance IP/Ethernet switching silicon with L2~L4 processing capability.**

- **Competitive alternative with strong differentiation**

- **Key Features**
  - **120Gbps packet processing capability**
  - **128K MAC/64K IP LPM**
  - **Ethernet bridging, IPv4, IPv6 routing, MPLS/MPLS-TP switching, MPLS-TP OAM, SyncE, 1588, L2/L3 VPNs, NAT, ACL/QoS/H-QoS processing, DCB features (PFC, ETC, QCN, etc), CAPWAP, security features, etc.**

Part Number	Application
CTC5160	Access/Aggregation platform for Carrier Ethernet and Packet Transport

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CTC5160- Differentiations

- **Focus on Enterprise and Data Center Market**
- **Competitive features with large table**
  - Support Cut-Through Forwarding
  - Support DCB/CAPWAP for converged network
  - Leading SDN support with up to 64K Exact Match Flows
  - Support NAT64 / IVI for IPv6 Transition
- **Versatile Applications**
  - Support 48GE + 4x10GE + 2x20G stacking
  - Support Horizontal Virtual Stacking via CloudStacking™
  - Support Connect to any 10GE switch for Chassis Applications
- **Lower Power for Fan-less Design**

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CTC5160 - New Data Center Features

- **Low Latency**
  - Cut Through
- **Lossless Ethernet**
  - 802.1Qbb PFC (Priority Flow Control)
  - 802.1Qaz ETS (Enhanced Transmission Selection)
  - 802.1Qau QCN (Quantized Congestion Notification)
  - Data Center TCP
- **Virtualization**
  - 802.1Qbg VEPA (Virtual Ethernet Port Aggregation)
  - 802.1Qbh Port Extender
- **Layer 2 Scalability**
  - TRILL/SPB
- **Convergence**
  - FCoE

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CTC5160 - SDN Innovations

- **App-oriented flow table with optimization for most popular applications**
- **Large flow tables (up to 32K)**
- **Up to 16K per-flow counters and 8K per-flow meters**
- **Programmable multiple flow processing stages**
- **Programmable flow processing**
  - Programmable flow table size and width
  - Programmable match fields
  - Programmable actions

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Centec OpenFlow Solution Highlights

- **Switching Silicon**
  - CTC5160: Ethernet switching silicon competitive for OpenFlow, high density 1G
  - GoldenGate: High density 10GE silicon with OpenFlow optimized design

- **Turnkey Solutions**
  - V350 System purposely built for data center ToR switch, base on CTC5160
  - support OF1.3，tunnels .etc
  - Source code(Open vSwitch ＆SDK) available to customers
  - Support ODM business model

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Centec OpenFlow Solution: V350

- **V350 Series is built on Centec's CTC5160 silicon, integrating the open source Open vSwitch and Centec's SDK to provide a complete system solution.**

Models	Port Configuration	Description
V350-48T4X	48 x 10/100/1000M RJ45 4 x 10GE SFP+	■ Pluggable AC/DC Power Module ■ Fixed and Speed Adjustable Fans (Front to Rear airflow) ■ Support RJ45 Console and Eth Management port
V350-8TS12X	- 8x10/100/1000M RJ45, 8x1000 Base-X SFP ports (Combo) - 12 x 10GE SFP+	

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V350 Highlight Summary (1)

- Cut through for Low latency
- Support N-Flow™ SDN innovation
- Support up to 2K wildcard match flows with complete L2-L4 match fields and statistics
- Support up to 32K exact match flows (Match fields can be customized)
- Wire-speed for all 48x1GE + 4x10GE
- Low system power - less than 65W

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V350 Highlight Summary (2)

- **Support OpenFlow 1.3**
- **Flexible editing**
- **Multiple flow tables**
- **Group Table**
- **Meter Table**
- **Tunnel**
  - NVGRE
  - MPLS L2VPN

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Centec System Solution Roadmap

2H/2012

1G + 10G

CTC6048

- 48x1G + 4x10G
- 32K MAC / 16K IP
- MPLS / Metro
- 16Kx80 TCAM
- External TCAM Support

E330

- 48x1G + 4x10G
- Product quality switch software

V330

- 48x1G + 4x 10G
- OVS 1.5 / OF 1.0
- 2.5K 12-tuple flow
- NvGRE / MPLS tunnel
- Multi-destination
- More editing actions
- Complete Open Source

1H/2013

CTC5160

- 48x1G + 8x10G
- 128K MAC / 64K IP
- MPLS / Metro
- < $100 in cost

2H/2013

E350

- 48x1G + 4x10G
- 8x1G + 12x10G
- 24x10G
- Product quality switch software

V350

- 48x1G + 4x10G
- 8x1G + 12x10G
- Large hash based flow

1H/2015

E150

- 4x1G + 2x10G
- Product quality switch software

V150

- 4x1G + 2x10G
- Large hash based flow

GoldenGate

- 96 x 10G / 24 x 24G
- 48 x 10G + 4 x 100G
- 256K MAC / 128K IP
- MPLS / Metro
- SDN Innovations

E580

- 48x10G + 2x40G + 4x100G
- 48x10G + 6x40G
- 24x40G
- 32x10G + 2x40G
- Product quality switch software
- OpenFlow
- Data Center

10G

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SDN/OpenFlow Technology Roadmap

- **V350 Software (Q3/2013)**
  - Support OpenFlow V1.3 Spec
  - Contribute to OVS Community include ASIC SDK & adaptation layer

- **GoldenGate ASIC (Q4/2014)**
  - 720G wire-speed, support 48x10GE + 6x40GE
  - Optimized for WhiteBox market opportunity, cost/power
  - SDN/OpenFlow Innovation
  - L2 over L3 tunnel support: NVGRE, VXLAN, GENEVA, STT

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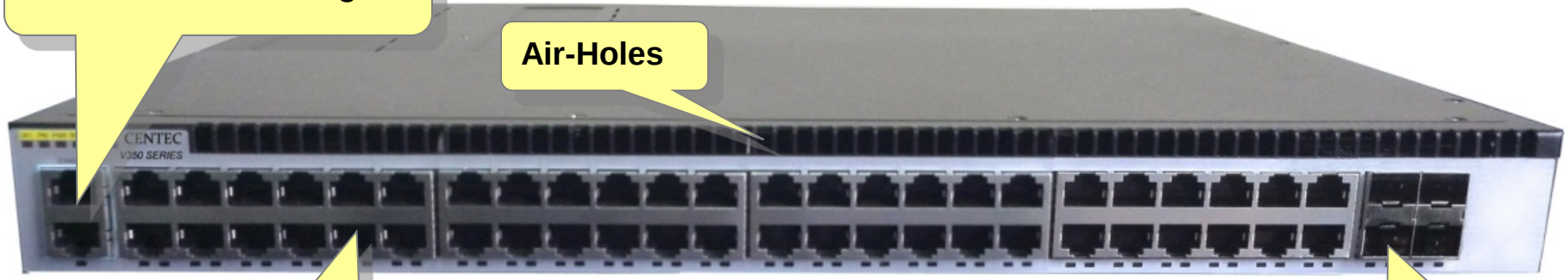
V350-48T4X Hardware Platform

- RJ45 Serial Port
- Ethernet Port for Mgmt

Air-Holes



48x1GE Copper

4 SFP+ Uplink ports

Fixed and speed-tunable fans

AC/DC replaceable dual power supply

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V350-48T4X Hardware Spec Summary

- **Product Dimension:** Standard 1RU, and the depth is about 350 mm
- **Downlink Network Ports:** 48 x 10/100/1000M RJ45
- **Uplink Network Ports:** 4 x 10GE SFP+

- **Flash:** 2GB(NAND) **RAM:** 1GB (Could be extended to 2GB)
- **CPU:** PowerPC P1010 533MHz **OS:** Linux
- **PHY:** Vitesse 1G PHY(QSGMII)
- **Power Consumption:** 48GE + 4x10GE < 65W

- **RJ45 Console port, Ethernet Management Ports**
- **FRU AC or DC** dual Power Supply
- **Fixed FANs with adjustable speed**

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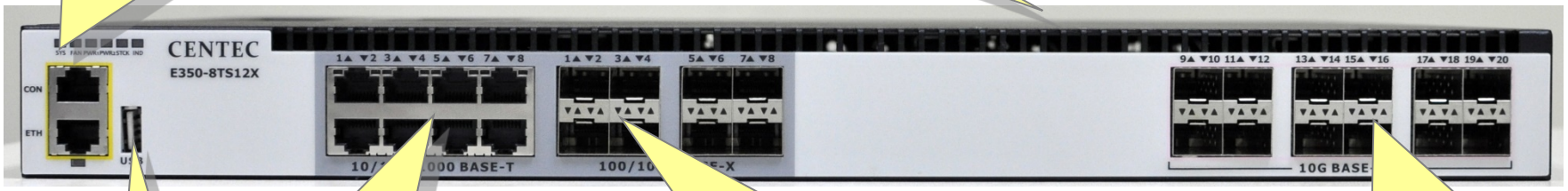
V350-8TS12X Hardware Platform

- RJ45 Serial Port
- Ethernet Port for Mgmt

Air-Holes

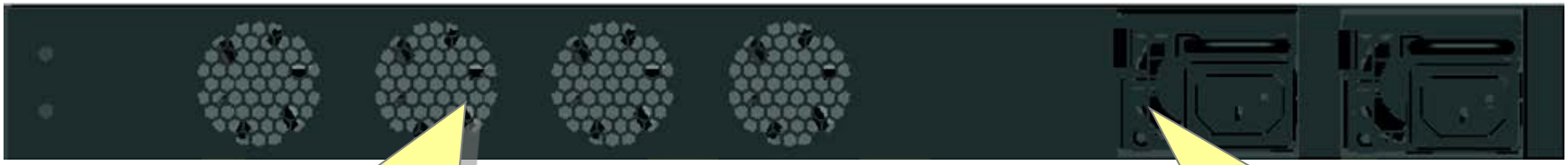


USB

8x1GE Copper

8x1GE SFP (Combo)

12 x 10G SFP+ ports



Fixed and speed-tunable fans

AC/DC replaceable dual power supply

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V350-8TS12X Hardware Spec Summary

- **Product Dimension:** Standard 1RU, and the depth is about 310 mm
- **1G Network Ports:** 8 x 10/100/1000M RJ45, 8x1000 Base-X SFP (Combo)
- **10G Network Ports:** 12 x 10GE SFP+

- **Flash:** 2GB(NAND) **RAM:** 1GB (Could be extended to 2GB)
- **CPU:** PowerPC P1010 533MHz **OS:** Linux
- **PHY:** Vitesse 1G PHY(QSGMII)
- **Power Consumption:** 8GE + 12x10GE < 47W

- **RJ45 Console port, Ethernet Management Ports**
- **FRU AC or DC** dual Power Supply
- **Fixed FANs with adjustable speed**

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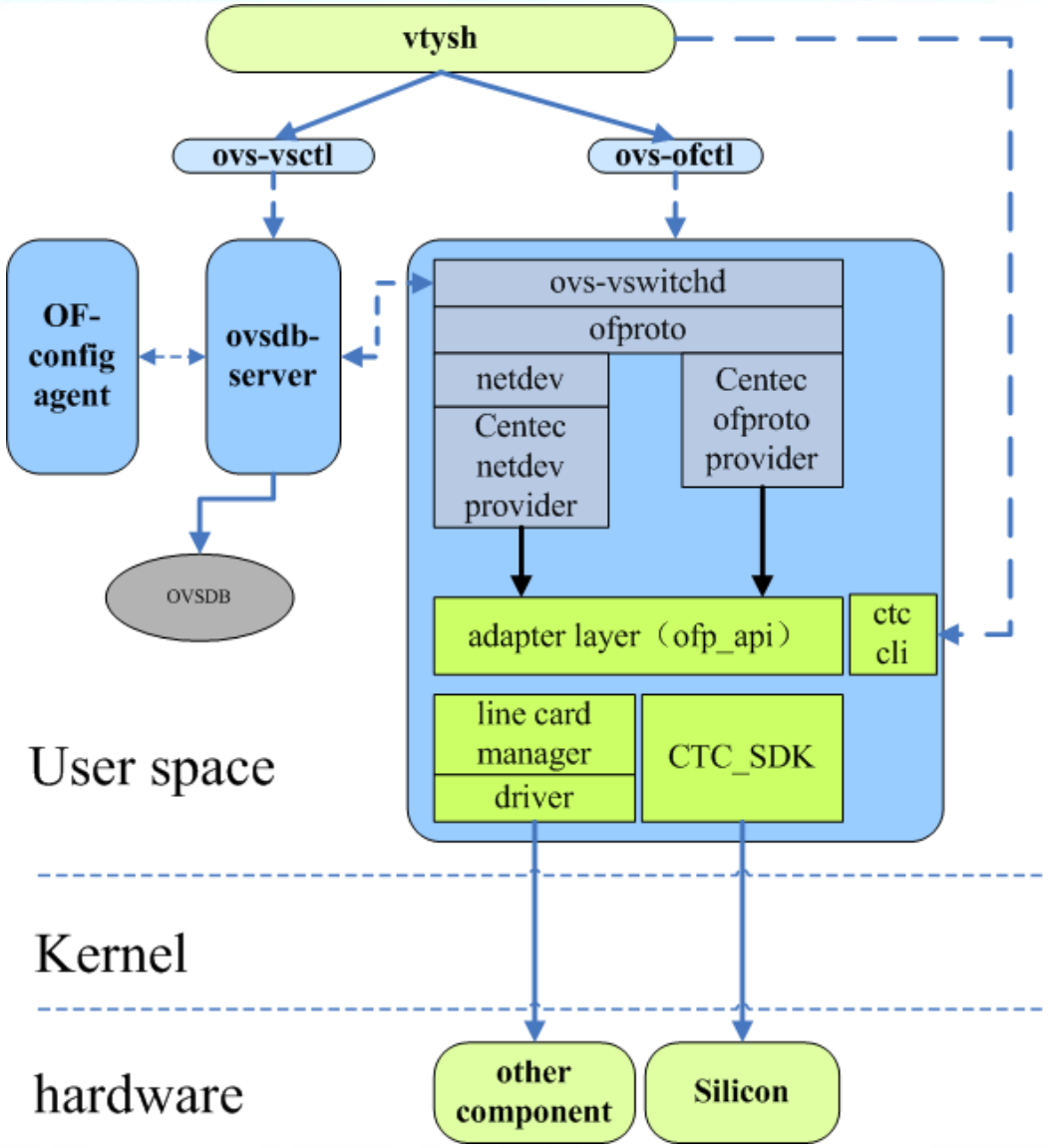
V350 Software Architecture



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Debian Linux

- Native Debian system running on top of Switch
- Easy to manage the switch
- Easy to install versatile tools and packages
- Improve DevOps

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OpenFlow Features Specification - Match Field

- **Physical Information**
  - Incoming Port
- **Layer 2 information**
  - MAC SA/DA
  - VLAN ID
  - VLAN PCP
  - L2 Type
- **Layer 3 & Layer 4 information**
  - ARP operation
  - ARP SPA and TPA
  - ICMP type/ICMP code
  - IP SA/DA
  - IP ToS
  - L3 Protocol
  - TCP/UDP Source or Destination Port Number
- **MPLS field**
  - MPLS Label/TC

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OpenFlow Features Specification - Actions

- **Forward**
  - All
  - CONTROLLER
  - LOCAL
  - IN_PORT
- **Modify-field**
  - Set VLAN ID
  - Modify source MAC address
  - Modify destination MAC address
  - Modify IPv4 destination address
  - Modify TCP or UDP destination port
  - Set MPLS Label/TC/TTL

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OpenFlow Features Specification - Actions

- **Push-Tag/Pop-Tag**
  - Push/Pop MPLS label
  - Push/Pop VLAN tags
- **GRE Tunnel**
- **MPLS L2 VPN**
- **Group**
- **Set-queue**

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OpenFlow Features Specification - Management

- **Controller**
  - Capable to Configure/Delete/Reset the controller linked to on the switch
  - Multiple controllers
  - Verified controller
    - OpenDaylight, Floodlight Controller, NOX Controller, RYU Controller

- **Stats**
  - Per Flow
  - Per Port
  - Per Meter
  - Per Group

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V350 Package

- **Hardware**
  - Centec CTC5160 Ethernet Switching Silicon
  - Productized ToR Switch Platform
- **Software**
  - Centec Optimized SDK for OpenFlow
  - Open vSwitch (OVS)
- **Documentation**
  - Product Brief & Data Sheet
  - Product Spec
  - CLI& User Guide
  - Developer Guide

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Documentation

- V350 Product Brief
- V350 Data Sheet
- V350 Specification
- V350 Command Line Reference
- V350 User Guide
- V350 Developer Guide
- V350 Release Notes

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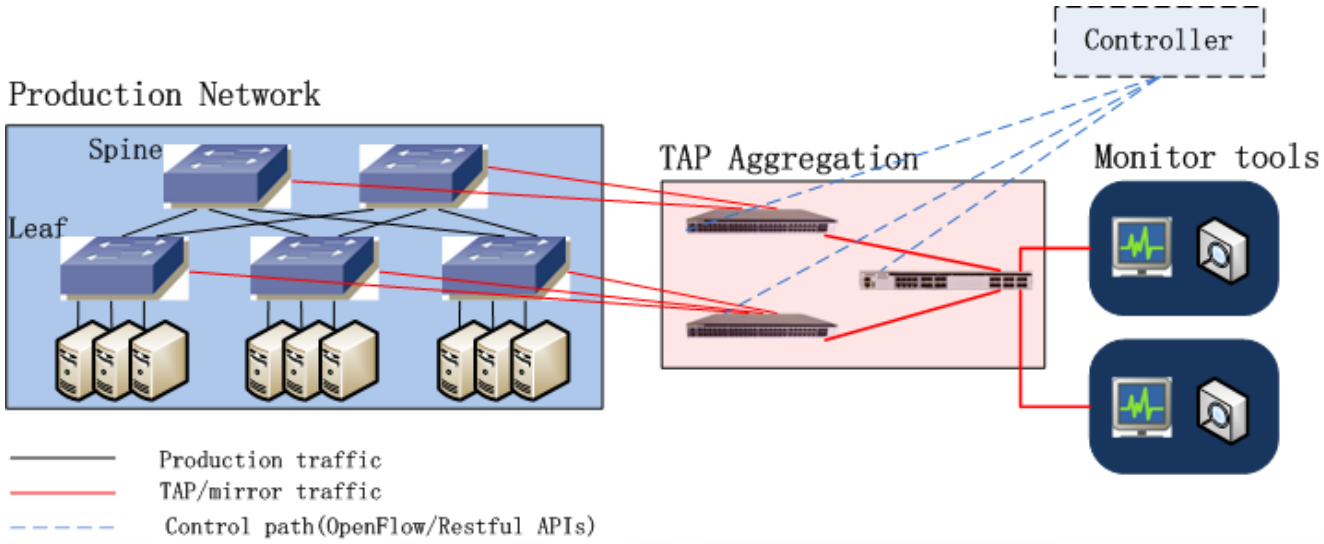
TAP

- **Deployed at both carrier networks in Europe and financial networks in China**

- **Why SDN and white box**
  - Traditional TAP device is dedicated, very expensive and operationally complex
  - SDN provides full network visibility and is able to eliminate vendor lock-in
  - Good enough to satisfy many customers



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TAP Highlights

- Aggregation of network links and/or span ports
- Filter and load-balance traffic from the 10-Gbps link to multiple 1-Gbps monitoring tool or aggregate multiple 1-Gbps links to 10-Gbps monitoring tools
- Many to Any and Any to Many
- OpenFlow/OPEN APIs

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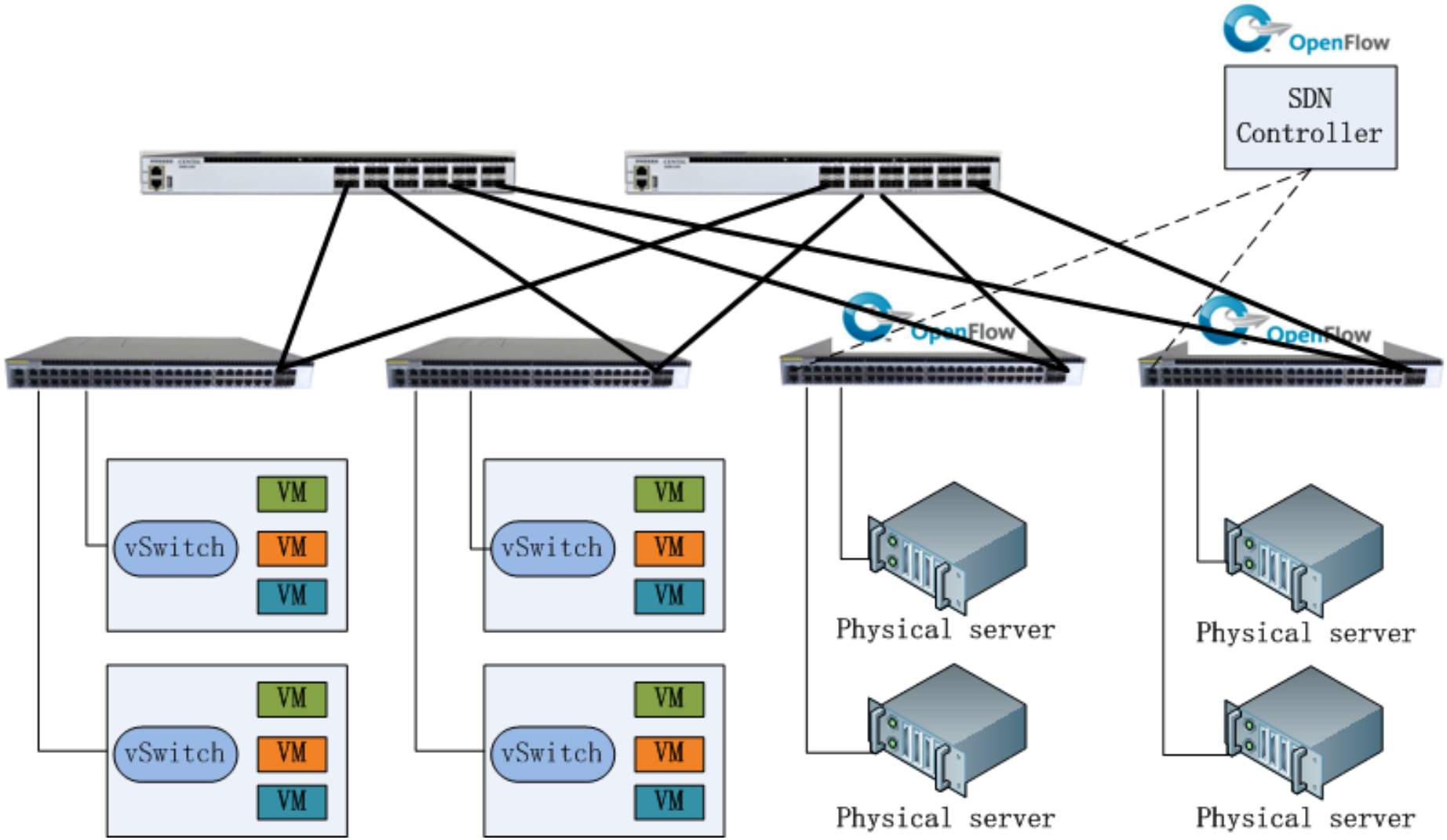
VTEP (Tunnel Gateway)



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VTEP (Tunnel Gateway) highlights

- Deployed in cloud providers in China
- Adapted with Cloud orchestrations like OpenStack
- Improved performance and scalability
- Distribute L3 services

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Hardware Acceleration by Centec OF switch

- **L2 over GRE flows**
  - Up to 20K
- **GRE tunnel**
  - Up to 10K

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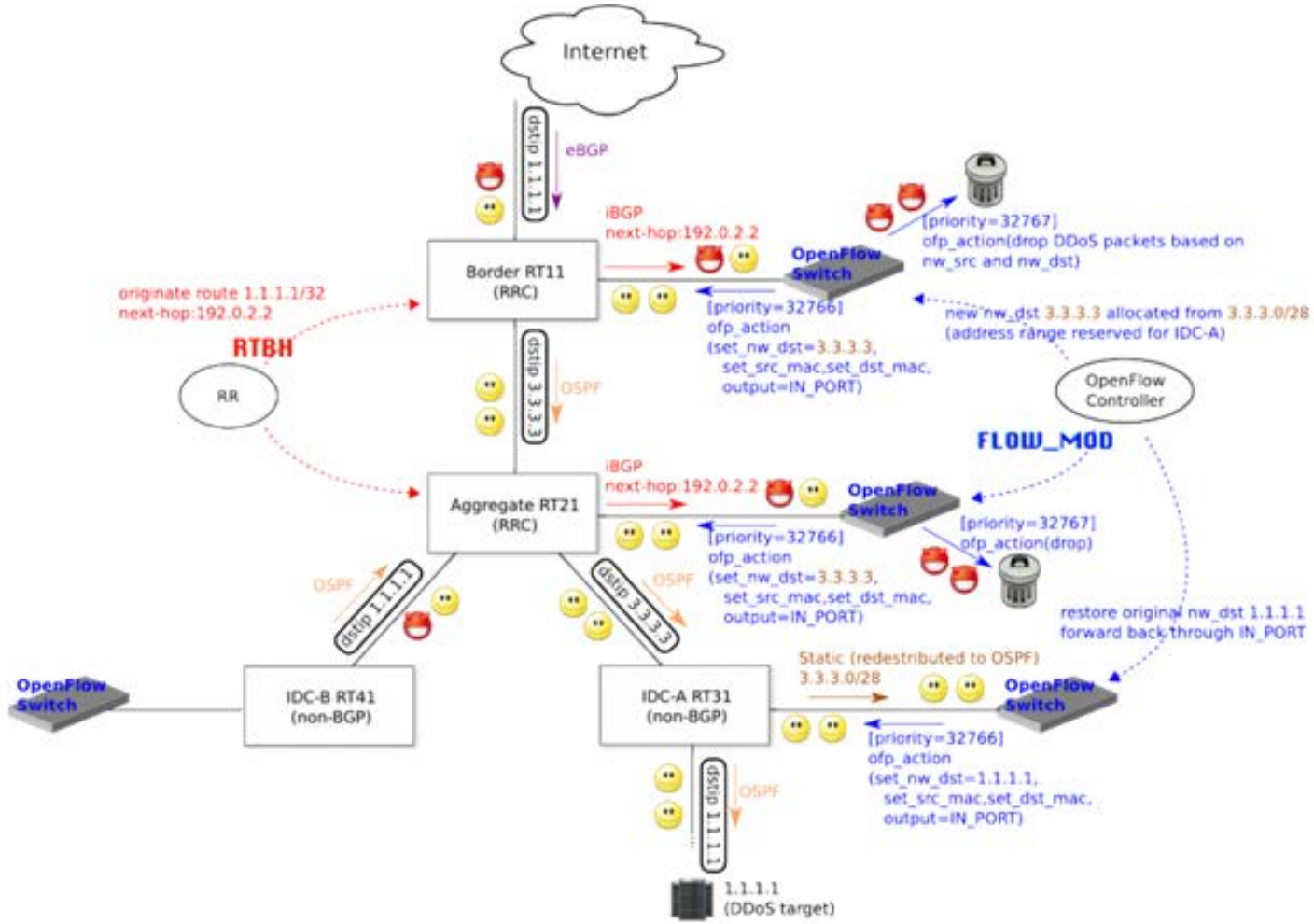
DDoS security



source of the picture -- http://packetpushers.net/centec-v330-my-kind-of-openflow-switch/

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DDoS security - Highlights

- Deployed at Japanese ISP
- Requirement to modify dest IP
- Support priority of flow entries
- Wire-speed performance

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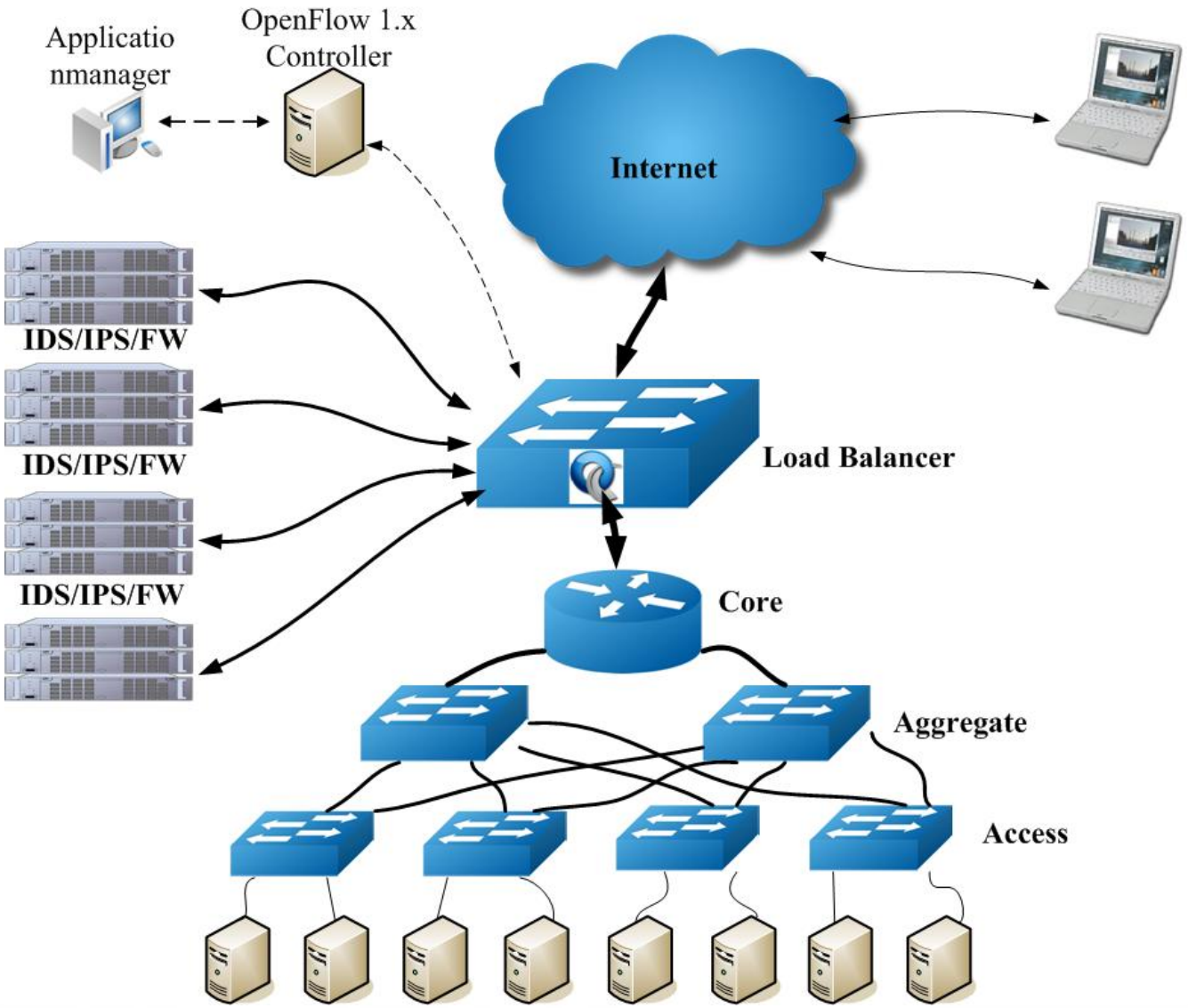
Openflow Based Load Balancing



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OF Based Load Balance Highlights

- **Cooperate with security vendors**
- **Use Top of Rack (ToR) switch to distribute traffic**
- **Replicates the functionality in load balance appliances**
- **Controller handles the control plane operation but switch handles forwarding**
  - flexibility
  - low cost
  - high throughput deployments

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Load Balance by OpenFlow

- **Match fields**
  - L2 header
  - L3 + L4 header
  - L2 + L3 + L4 header
- **Group table (selective) defined in OF1.1+**
  - Hash algorithms implemented by Silicon

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