

# VPN4DC Discussion

**VPN4DC Team**

11-16-2011

Taipei, Taiwan

# Contributors of VPN4DC Initiative

Amit Shukla	Juniper	Manuel Paul	DT
Ben Niven-Jenkins	Velocix	Maria Napierala	AT&T
Bhumip Khasnabish	ZTE	Marshall Eubanks	LiftPort Group
Dave McDysan	Verizon	Masahiro Maruyoshi	NTT
Deborah Brungard	AT&T	Michael Ko	Huawei Symantec
Fred Baker	Cisco	Nabil Bitar	Verizon
Grant Watson	BT	Ning So	Verizon
Henry Yu	Telecom	Robert Raszuk	NTT
Ichiro Fukuda	NTT	Thomas Morin	FT
James Uttaro	AT&T	Pedro Marques	
John M. Heinz	CenturyLink	Ping Pan	Infinera
Linda Dunbar	Huawei	Paul Unbehagen	Avaya
Lianyuan Li	CMCC	Susan Hares	Huawei
Lizhong Jin	ZTE	Tom Nadeau	CA
Lucy Young	Huawei	Yuichi Ikejiri	NTT
Luyuan Fang	Cisco		

# 10 VPN4DC Active Internet Draft

<http://tools.ietf.org/html/draft-bitar-datacenter-vpn-applicability-01>

<http://tools.ietf.org/html/draft-so-vpn4dc-00>

<http://datatracker.ietf.org/doc/draft-so-vdcs-01>

<http://tools.ietf.org/html/draft-dunbar-vpn4dc-problem-statement-00>

<http://tools.ietf.org/html/draft-fang-vpn4dc-problem-statement-00>

<http://tools.ietf.org/html/draft-ko-dsi-problem-statement-00>

<http://tools.ietf.org/html/draft-jin-l3vpn-vpn4dc-interconnect-00>

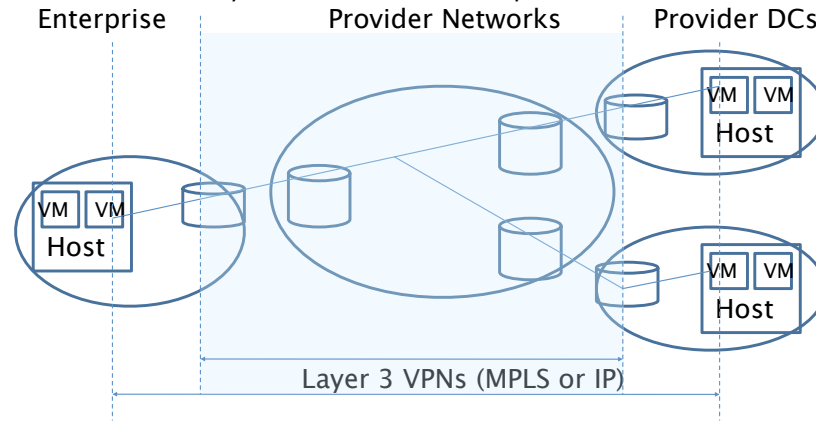
<http://tools.ietf.org/html/draft-yong-vpn4dc-protocol-gap-analysis-00>

<http://tools.ietf.org/html/draft-zeng-vpn4dc-example-solution-00>

<http://tools.ietf.org/html/draft-marques-l3vpn-end-system-02>

# What do we want to achieve?

- Develop standards-based any-to-any vpn (may use mpls, ipv4/v6 technologies) Data center connections through control protocol signaling to addressing large scale VPN in DC multi-tenant environment.
  - L3 technologies WILL be used for inter and intra DC connections
  - L2vpn technologies MAY be used within data centers
  - DCs can belong to service providers, Content providers, and enterprises.
  - Providers are likely interconnect with multiple DC-vendors and vice-versa



## What are the new problems?

- The new DC related needs compare with the existing provider provisioned L3VPN solution environment (MPLS or IP)?
  - Multi-tenancy hosting in DC, provider offered cloud services through shared infra
  - Scalability in the data center: large number of hosts, e.g. 100,000+ hosts in single data center, each host supports 25 VMs
  - Mobility
  - Security and authentication in the new environment

# Who Needs I3 VPN for DC Connections?

(co-authors of req. drafts, and active contributors of

Ning So	Verizon
Nabil Bitar	Verizon
Dave McDysan	Verizon
Henry Yu	TW Telecom
John M. Heinz	CenturyLink
Maria Napierala	AT&T
James Uttaro	AT&T
Robert Rasuzk	NTT
Ichiro Fukuda	NTT
Yuichi Ikejiri	NTT
Masahiro Maruyoshi	NTT
Thomas Morin	FT
Manuel Paul	DT

# Connectivity Requirements

- Hosts in DCs joining a VRF in near real-time
- Formation of any-host-to-any-host connectivity within a VRF
- Service requirement (bandwidth, QoS, and etc.) exchange between hosts and L3VPN
- Host address assignment control
- OAM interworking

# Service Requirements

- VPN4DC computing services
  - Virtual Machines (VMs) and/or physical servers in a virtualized carrier data center being attached to a customer VPN
  - Requirements: auto-provisioning, VM and server instantiation and removal, VM migration policy control, VM monitoring
- VPN4DC storage services
  - disk space, either virtual or actual blocks of hard drives in data centers, being added to a customer's VPN
  - Requirements: content replication control, storage space auto-provisioning, storage migration policy control, content life cycle management



# Service Requirements

- **Intra-DC Network Requirements**
  - Requirements when VPNs are extended into DC using VPN Gateway
    - Traffic separation per VPN and per service
    - DC virtual resource assignment control and reporting
    - Dynamic configuration and provisioning control of DC virtual resources
    - QoS support
- **Virtual Resources Management Requirements**
  - DC virtual resources include physical servers and VMs, disk spaces, memories, intra-DC network connections and bandwidth.
  - Requirements include
    - Resource partition and assignment

# Other Requirements

- Security requirements
- Auto-configuration requirements
- OAM requirements
- And etc.

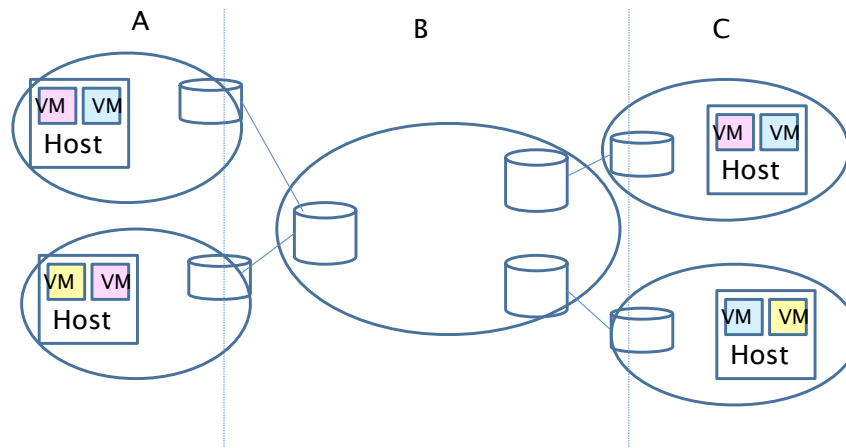
## Is this IETF problem to solve?

- Yes, layer 3 (IP or MPLS) VPN connectivity is in IETF routing area
- IP protocol extensions or new mechanism for current solutions to DC

## DC Connection Scenarios

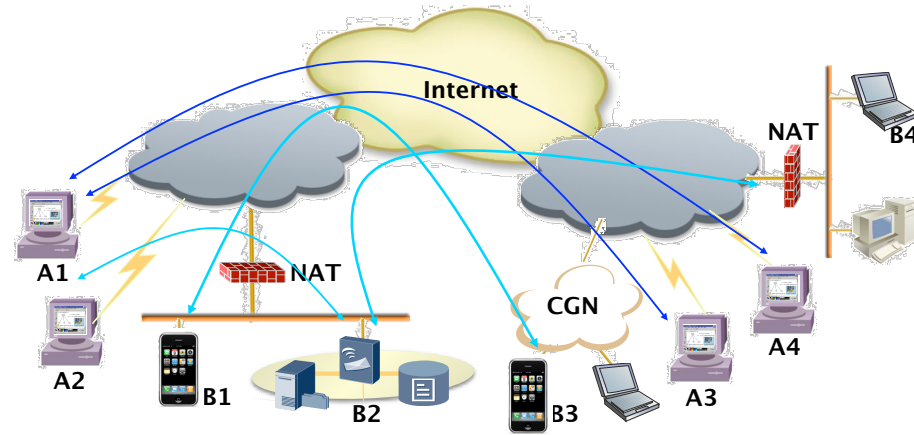
- The DCs can be in Public Cloud or Private Cloud
- Connection can be combinations of any type of Cloud
- Examples of VPN connection scenarios
  - Enterprise CE to Service Provider DCs
  - Enterprise DC to Service Provider DCs
  - Enterprise DC to Content Provider DCs
  - Content provider DC to Service Provider DCs
  - Intra-DC connections
  - Content Provider

# L3 VPN DC Connection Examples



Example	A	B	C
1	Enterprise	Network Service Provider	SP Cloud Service
2	Enterprise	Network Service Provider	Cloud Service
3	Cloud	Network Service Provider	SP Cloud Service

# Dynamic Secure Interconnect Example



# What are in and what are out?

- In Scope for first phase
  - Any-to-any layer 3 VPN connectivity, focusing on route isolation
  - Develop both IP and MPLS solutions, as well hybrid solutions
  - Inter-DC and intra-DC layer 3 connections
  - Inter-vpn connectivity / Extranet VPNs
  - Mechanism for cloud resource mapping to the customer VPN
  - Security authentication for VM to VPN mapping
- Possible future phase
  - L3/L2 Hybrid VPN
  - Multicast
- Out of scope
  - New encryption algorithms (not in IETF)
  - Pure L2 VPN solutions (L2VPN)