Cloudbursting Use Case for SDNP

draft-mcdysan-sdn-p-cloudbursting-usecase-00
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Background, Motivation & Requirements

• NIST Cloud Computing Based Terminology
  – Private Cloud – operated by an enterprise
  – Public Cloud – multi-tenant data center operated by a service provider
  – Virtual Private Cloud – multi-tenant data center intended to be a dynamic extension of a private cloud
  – Hybrid Cloud – Dynamically instantiated instance of a public (or virtual private) cloud to (temporarily) augment capacity of a private cloud

• Cloud computing capacity requires control and management at least:
  – Layer 1/Layer 2/Layer 3 bandwidth configuration and monitoring (scheduler weight setting, policer setting, reserving/scheduling/requesting bandwidth (e.g., MS-PW, counter collection)
  – VPN membership (e.g., VLAN, L2VPN/L3VPN, etc.) configuration, discovery, policy
  – Compute resources: virtual machines, virtual memory, OS, software assignment and activation on a physical computer
  – Storage resources: Partition(s) (e.g., Logical Unit Name (LUN)) assigned to physical storage
  – Other data center resources (firewalls, load balancers, NAT, gateways, security functions, etc.)
  – Interconnection, reachability, bandwidth, quality, resiliency for all of the above

• More detail for sections 6.2, 6.3 of draft-pan-sdn-dc-problem-statement-and-use-cases-00
• Requirements for some of the above previously submitted to opsawg in Quebec City (see references in draft)
• May also have performance, resiliency, and diversity related requirements (see CSO references in draft)
Cloudbursting in a Hybrid Cloud Environment

Private Cloud Data Center 1

VM
Compute

VM
Compute

LUN
Storage

LUN
Storage

1's Controller

Private Cloud Data Center 2

VM
Compute

VM
Compute

LUN
Storage

LUN
Storage

2's Controller

Layer 1/2/3 Network

Legend
- Physical Connection
- Hybrid Cloud API
- Control L2/L3 Bandwidth
- Control VPN Assignment
- Control VM Assignment
- Control LUN Assignment

SP Virtualization, Programmability and Monitoring

“Application-Orchestrator Protocol”

Service Provider
Public/Virtual Private Cloud Data Center

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Problems to be Solved (Somewhere, Somehow)

• Private Cloud customer desires a single interface (e.g., “Application-to-Orchestrator protocol”) to invoke a dynamic cloudburst comprised of previously described aspects of a hybrid cloud service
  – Orchestration System may not be able to meet all requirements and may respond with alternative(s)
  – All aspects of the transaction must either succeed or fail
  – Must be able to perform negotiation

• Security considerations include consistent configuration of security elements in private and public/virtual private data center elements

• Should use interfaces standardized by IETF or other SDOs
  – May be control plane (signaling, routing) and/or management style
  – May define extensions to existing protocols, or if absolutely necessary new protocols

• Not all interfaces need be standardized
  – For example, those used within a private data center

• Problem space can be partitioned between private and public/virtual private data center elements as summarized in the draft

• Overall framework outlining this class of use case (and similarities with others) and how existing protocols can be used, identification of specific gaps, and optimization/standardization opportunities would be a useful IETF output