Mastering a Multi-cloud Approach:
Manage the flow of data and applications across data centers and cloud platforms, while avoiding vendor lock-in, and enhancing efficiency, flexibility, and scalability.

Executive Overview
Enterprises today are realizing that it’s a multi-cloud world. Recent findings from Microsoft and 451 Research state that nearly one third of organizations work with four or more cloud service providers. As organizations shift towards a multi-cloud approach, new challenges have begun to emerge. Most notably, security, agility, performance, and costs have become difficult to manage or control across varied cloud platforms. Compounding the matter is that maintaining consistent regulatory compliance, confidentiality, and data segregation now requires major time and resource investments, making a multi-cloud approach both expensive and daunting.

The 128T Session Smart™ Router delivers unique advantages that help businesses simplify deployment and create consistency across their multi-cloud environments. This modernized, service-centric, session-oriented, and security-infused routing model can be leveraged with private clouds or public clouds such as Amazon Web Services (AWS), Azure, and Google Cloud Platform (GCP). The 128T solution can be used to securely interconnect different clouds and branches through a Zero Trust Security (ZTS) model, which takes a “never trust” approach to users, applications, and endpoints alike. The 128T solution’s hypersegmentation feature is based on a global multi-tenanted data model that offers almost limitless hierarchical tenancy and fine grained, per-service access policies. It provides confidential data transfer, access control, and compliance, along with dynamic load balancing, sub-second failover, and global policy definitions for scale across locations and a seamless end-user experience. In addition, end-to-end monitoring helps keep application traffic on the paths that can best support the required SLAs, offering elastic scalability and bandwidth savings—all while eliminating the bandwidth tax from tunnels.

Challenges
Using a multi-cloud approach presents new challenges to organizations in the following areas:

- Ensuring Security: According to the Cloud Security Alliance, the top threats to cloud computing are nefarious use, insecure APIs, malicious insiders, shared technology vulnerabilities, information hijacking, and data loss and leakage. With different uses and connectivity options across various cloud providers, there’s a need for continuous security, sophisticated logging capabilities, and advanced identity and access management.

- Achieving Agility: As applications are migrated to the cloud, they require differentiated and dynamic services to support them. Traditional routing solutions don’t treat packet flows as sessions. Instead, they route packets on an individual basis rather than establishing comprehensive bi-directional flows based on the unique needs of an application. This makes it extremely difficult to align network service with the changing needs of the business.
• Delivering Performance: Having the ability to run, migrate, scale, and spin up cloud resources on demand means that the networking solution needs to provide quality failover and performance. Today’s routing solutions require large compute resources to scale up to the number of tunnels they can maintain at once, which can be extremely costly.

• Managing Costs: Public cloud providers such as AWS and Azure offer cost-effective virtual machines, but the price of data transfer into and out of the cloud can be high. For network-intensive applications, these transfer expenses can be significant – especially when traditional routing solutions unnecessarily migrate the header data for every packet.

Once an organization decides to migrate applications to the cloud, adoption often accelerates as new benefits become evident quickly. However, performance problems can also rapidly develop, including traffic bottlenecks, inconsistent resiliency and uptime, weakened security, and network/system management gaps.

128T Solution
128T Session Smart Routers can be easily deployed in support of public and/or private clouds. Global policy definitions help organizations enforce consistent security and segmentation of traffic across different cloud platforms. This eliminates the need to maintain different context-specific access control lists (ACLs) for every cloud. The 128T solution also helps businesses achieve a number of their networking priorities, such as:

• ZTS and hypersegmentation
• Load balancing and global policy definitions
• Sub-second failover and application specific SLAs
• Bandwidth savings and infinite scale

Technical Use Cases
The 128T Session Smart Router can be used in numerous situations, enabling the network to meet the following business needs:

Data Center Interconnect: Virtualization and cloud computing are making data center interconnect (DCI) more important than ever. Historically DCI was primarily used to replicate data from a primary data center to a disaster recovery site or back up data center. Now, DCI enables enterprises to dynamically load balance compute resources across multiple sites. The 128T solution provides the ability to monitor paths and direct sessions, ultimately designating the most appropriate network or cloud provider for the needs of specific applications. This significantly reduces costs and risks, while improving overall performance.

Hybrid Cloud: Gartner claims that by 2020, 90% of organizations will adopt a hybrid infrastructure management model. The 128T solution complements this model, extending the capabilities of the private cloud to the public cloud with load balancing mechanisms that are integrated into the router itself. Now, private clouds can leverage public cloud capabilities to help businesses scale as needed.

Multi-Cloud: The 128T solution enables the use of multi-cloud computing services in a single architecture. For example, an enterprise may use different cloud providers at the same time for infrastructure and software services. Alternatively, they may use different infrastructure providers to support varying workloads, deploying a single workload that is load balanced across multiple providers (active-active), or deploying a single workload with one provider and a back up with another (active-passive).
Key Features
The 128T solution meets these demands by utilizing Session Smart technology to provide the following benefits:

- **ZTS and Hypersegmentation:** Under a ZTS model, connectivity is only allowed for authenticated endpoints or specified services. Any unauthorized access to services is denied, helping to remove the possibility of data breaches. The data is also encrypted to provide confidentiality while it's in transit. With hypersegmentation, tenants and associated security policies are globally defined and locally enforced, resulting in consistent security across all cloud platforms. Hierarchical tenancy models with service definitions allow fine grained access control, supporting dynamic changes and maximum flexibility.

- **Load Balancing and Global Policy Definitions:** One of the benefits of using a multi-cloud approach is being able to scale resources based on workload requirements. The 128T Session Smart Router works as a load balancer, handling traffic spikes and directing traffic to applications as required to enable scalability on demand. The ability to host applications in multi-cloud environments or in different public clouds can also improve reliability. If an outage hits one of the public clouds or an Internet region, the Session Smart Router can direct traffic away from the affected cloud resources to other public clouds. The Session Smart Router can also intelligently select certain clouds over others based on costs to increase savings. Global and dynamic policy applications allow for the changing of cloud platforms during run-time, based on real-time events.

- **Sub-second Failover and Application-specific SLAs:** The easiest, fastest, and cheapest way to connect to a public cloud is over the Internet. However, reliability over the Internet is not guaranteed. The 128T Session Smart Router can find the best paths to maintain connectivity and performance based on the SLAs required by the services. The 128T solution can also designate alternative paths using the Internet or—if required—through a co-location provider. It can also be programmed to monitor these paths, and switch paths as necessary. In case of failures along the path, the 128T solution can reroute packets without dropping sessions.

- **Bandwidth Savings and Infinite Scale:** On average, tunnels add a 30% overhead to network traffic. But with the 128T solution, tunnels are not required because encryption and security are inherent capabilities. Session Smart technology uses selective encryption, applying it only to data that isn't already encrypted. Reducing this tunnel overhead can generate substantial savings on data transfer into and out of the cloud. For a detailed analysis of cost savings, please refer to the ACG Research whitepaper titled, “The Economic Benefits of Session Smart Routing in SD-WAN and Cloud Networks.”

Summary
Organizations need to grow and manage their global computing infrastructures rapidly and efficiently while managing capital costs and expenses while providing superior end-user experiences. The 128T Session Smart router provides the perfect complement to multi-cloud deployments. It enables organizations to rapidly connect different cloud infrastructures while providing consistent security, superior agility, exclusive performance, and lower costs. On-demand elastic infrastructure can really enable organizations to save costs and scale. Using the 128T Session Smart router makes the process seamless and provides a consistent solution across multi-clouds.

ABOUT 128 TECHNOLOGY
128 Technology makes your network do what your business needs, by changing the way networks work. Our professional grade software teaches routers the language of applications and services, letting them understand the requirements of individual services and segments, and adapt the network dynamically to deliver what the business needs, when and where it needs it. We make routers Session Smart™, enabling enterprise customers and service providers to create a service-centric fabric that’s more simple, agile, and secure, delivering better performance at a lower cost.