



ENTERPRISE ARCHITECTURE



PRESENTER:
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ITC MANAGEMENT
05TH NOVEMBER 2015





About ITC Services

- ❑ Department under Ministry of Communication
- ❑ Responsible for the Fijian Government Information Technology (IT) Services
 - ❑ Technical Support & Solutions
 - ❑ Technical Consultation with government agencies
 - ❑ IT Procurement
 - ❑ IT Standards, Policies and Compliance
 - ❑ Information Security
 - ❑ Software and Digital Asset Management



Executive Summary

- Overview on the Data Center Enterprise Architecture for ITC.
- Enterprise Infrastructure Design
- Data Center as an E-Services initiative.
- ITC maintains a comprehensive data center network that combines best-in-class products with well-defined practices to build high-performance, robust, virtualized, cost-effective and business supported networks.





Executive Summary

- Our architecture achieves effective
 - ✓ Power capacity
 - ✓ Cooling
 - ✓ Increasing growth of the data centers
 - ✓ Availability
 - ✓ Security
 - ✓ Disaster recovery
 - ✓ Operational issues concerning change management and controlling operational costs
 - ✓ Zero-downtime or “extreme availability” as businesses are becoming increasingly global and are functioning 24x7.
 - ✓ Unified Communications
 - ✓ Web as a platform to deliver applications
 - ✓ Virtualization that goes beyond consolidation





Data Center Network Architecture

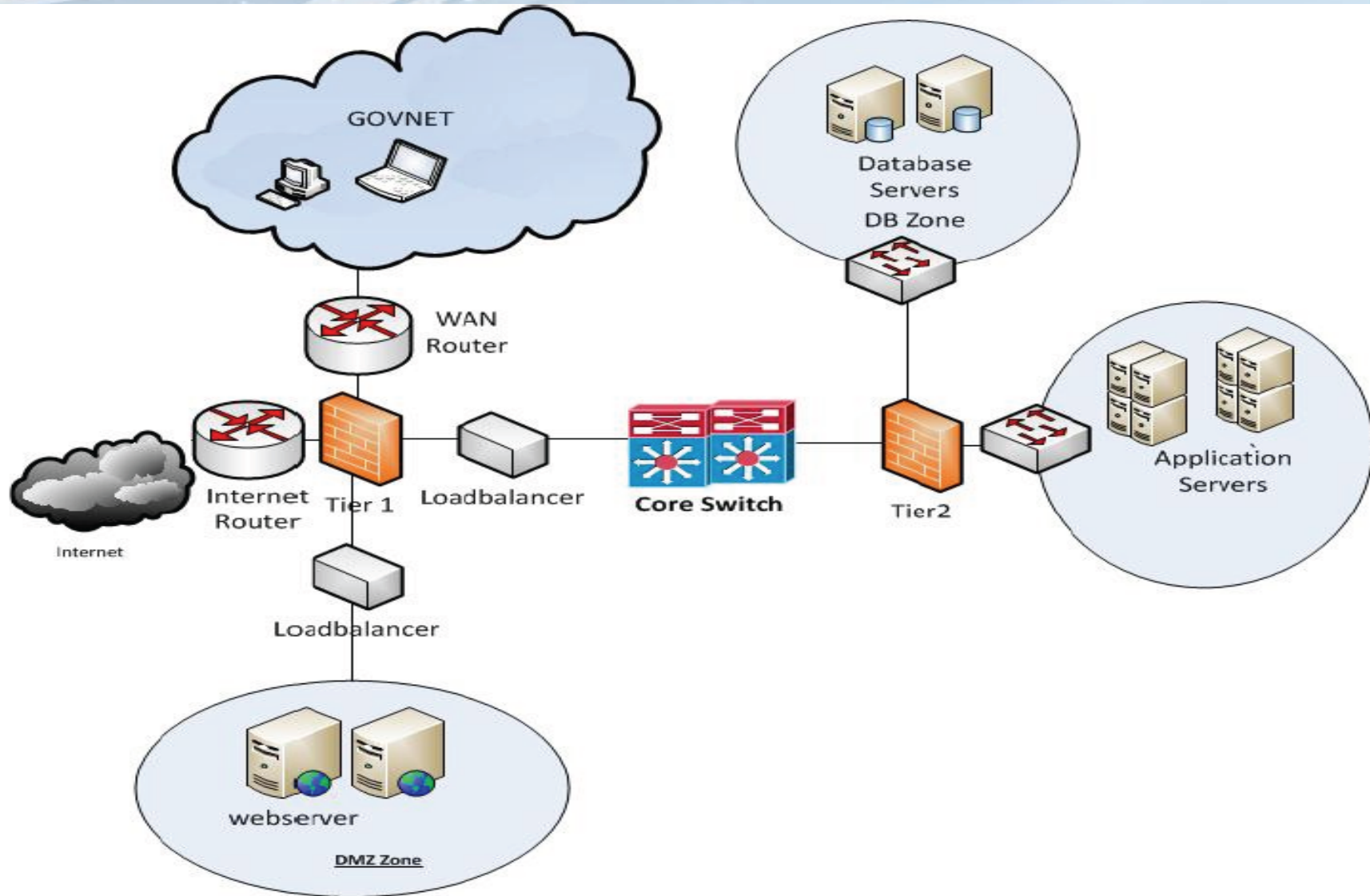
➤ Three Tier infrastructure

- ❖ Web (DMZ)Zone
- ❖ Application Zone
- ❖ Database Zone

➤ Benefits

- ❖ *Scalability*—Load-balance the Presentation tier among three servers to satisfy more Web requests without adding servers to the Application and Data tiers.
- ❖ *Performance*—Because the Presentation tier can cache requests, network utilization is minimized, and the load is reduced on the Application and Data tiers. If needed, you can load-balance any tier.
- ❖ *Availability*—If the Application tier server is down and caching is sufficient, the Presentation tier can process Web requests using the cache.







Network Infrastructure

CHALLENGES

- Concurrently, the challenge of working from any location in the enterprise further increases the complexity.
- Modern applications such as supply chain applications, demand significant network performance.
 - ❖ IP telephony
 - ❖ E-services
 - ❖ Web applications
 - ❖ Internet
 - ❖ Email services
 - ❖ And some CRM, ERP or automation applications

High performance LAN, WAN , SAN and Security infrastructure to address these challenges.





ITC Data Centre Facilities & Services

- ITC Service provides the following services from the Data Centre
 - Enterprise Infrastructure as a service
 - Backup & Restore Services
 - Colocations Services for government and statutory authorities
 - Centralized VOIP system
 - Video Conferencing service
 - Auto tiering Storage Access Network



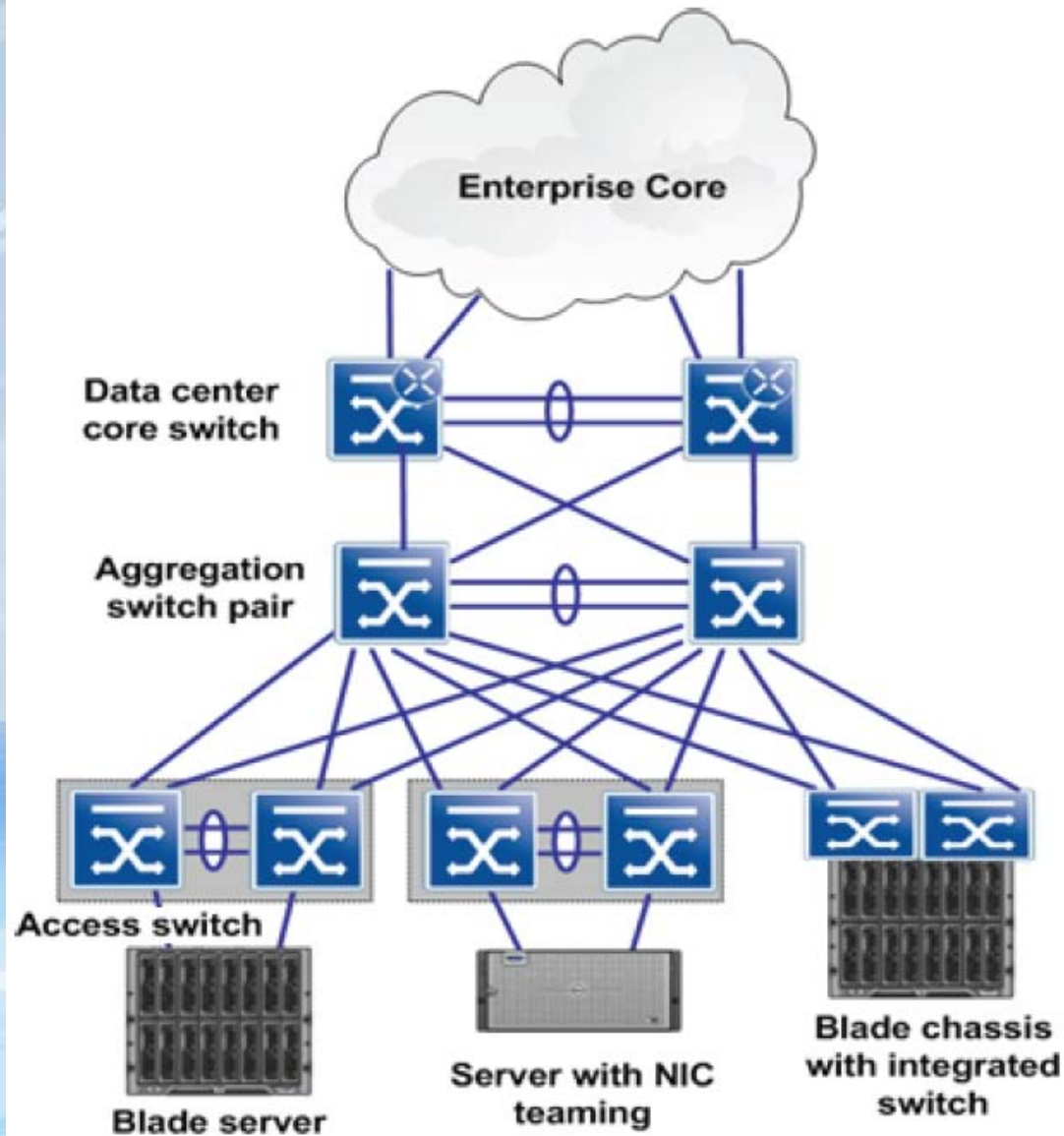
Major Government Online Services

- Internet Service
- Government Email service
- Birth Death & Marriage Application
- Immigration Application
- Titles & Deeds Registration
- Financial Management Information System
- Government Payroll
- Social Welfare
- eServices – iTaukei Affairs VKB, iTLB , Government Digitisation



Network – DC LAN

High available Core and
Access Layer switching





Network – WAN Design

- ❖ WAN connectivity to enable branch office and campus users to access their Server and its applications.
- ❖ Superior speed for data center backbone connectivity, data replication, business continuity and use of technologies such as *MPLS & leased line*
- ❖ *High Performance—Network security appliance, storage, servers and application.*





Network

Type of Connectivity Used in LAN and WAN

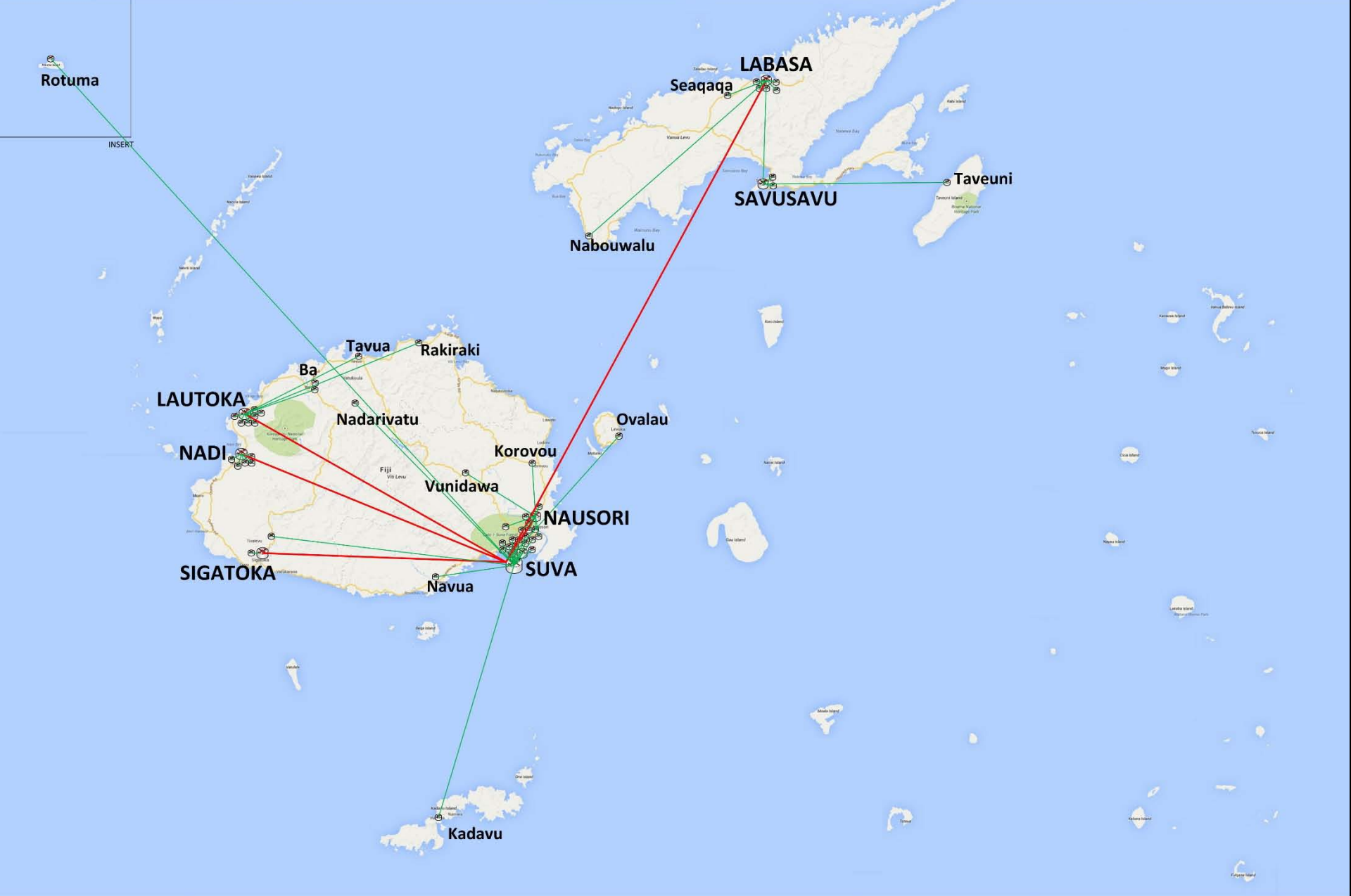
➤ LAN

- ❖ 1Gbps **Ethernet /Fiber** to the server and preferably 10 Gbps at network choke points.
- ❖ 1,4,8,10 Gbps **Fiber Channel /iSCSI** to the Servers and SAN.

➤ WAN

- ❖ **MPLS / VPN / Leased Line** connecting DC to Branches and other government Offices. Link Bandwidth up to 1 Gbps and its depend on the various department needs.
- ❖ Copper or Fibre Optic cables
- ❖ Wireless
- ❖ VSAT





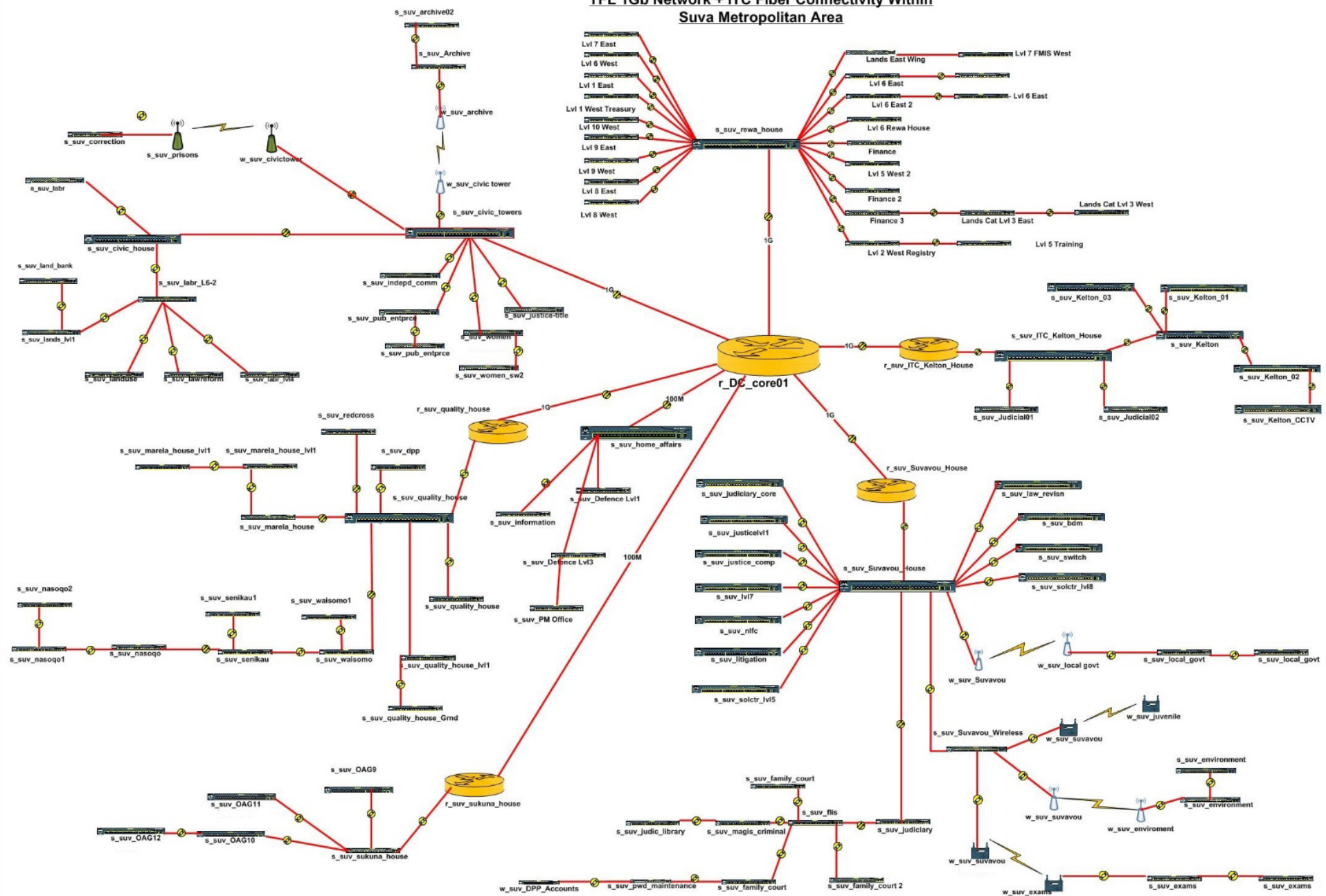
**Government
Backbone WAN**



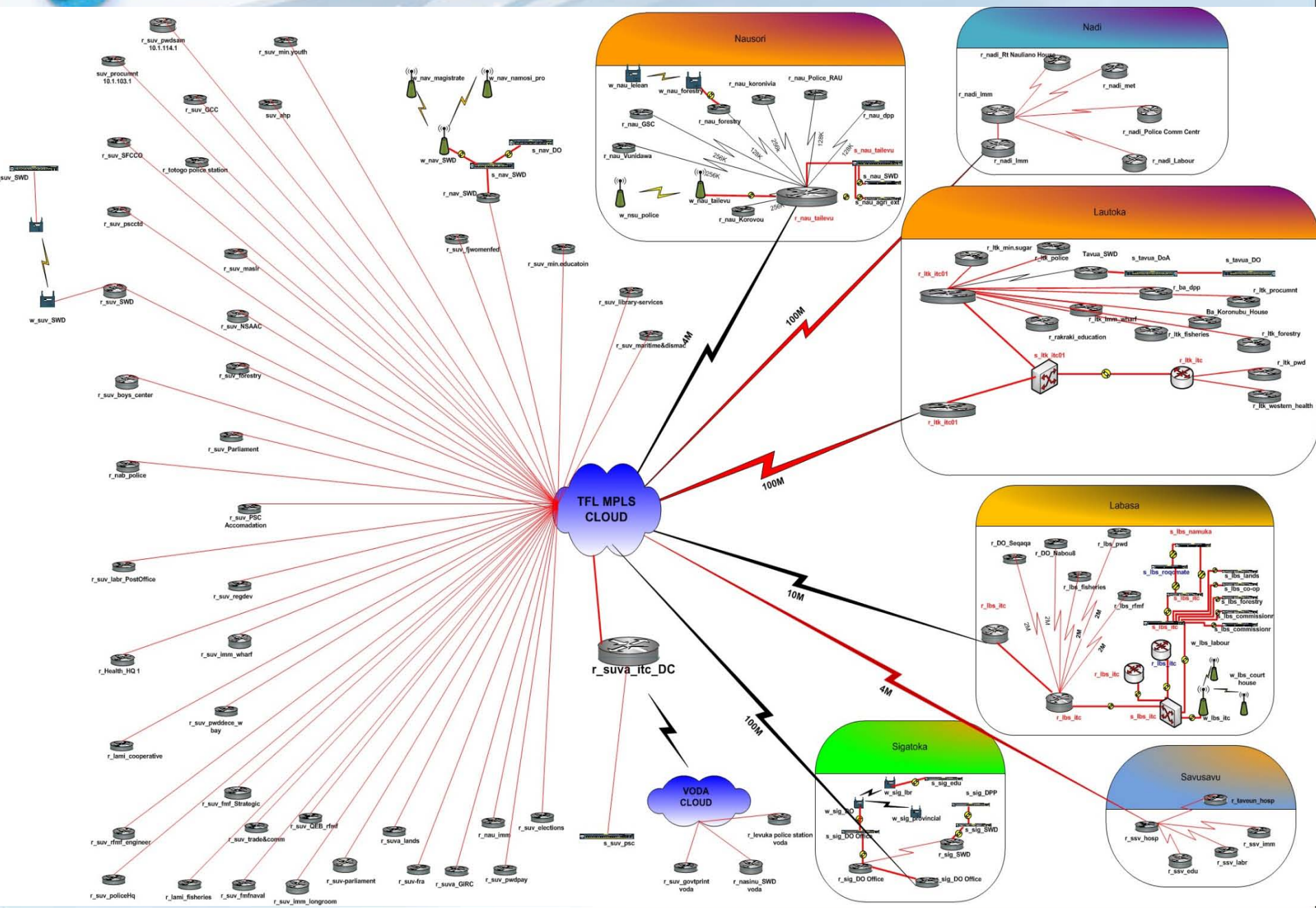


1G and Fiber Network

TFL 1Gb Network + ITC Fiber Connectivity Within Suva Metropolitan Area



ITC





Security

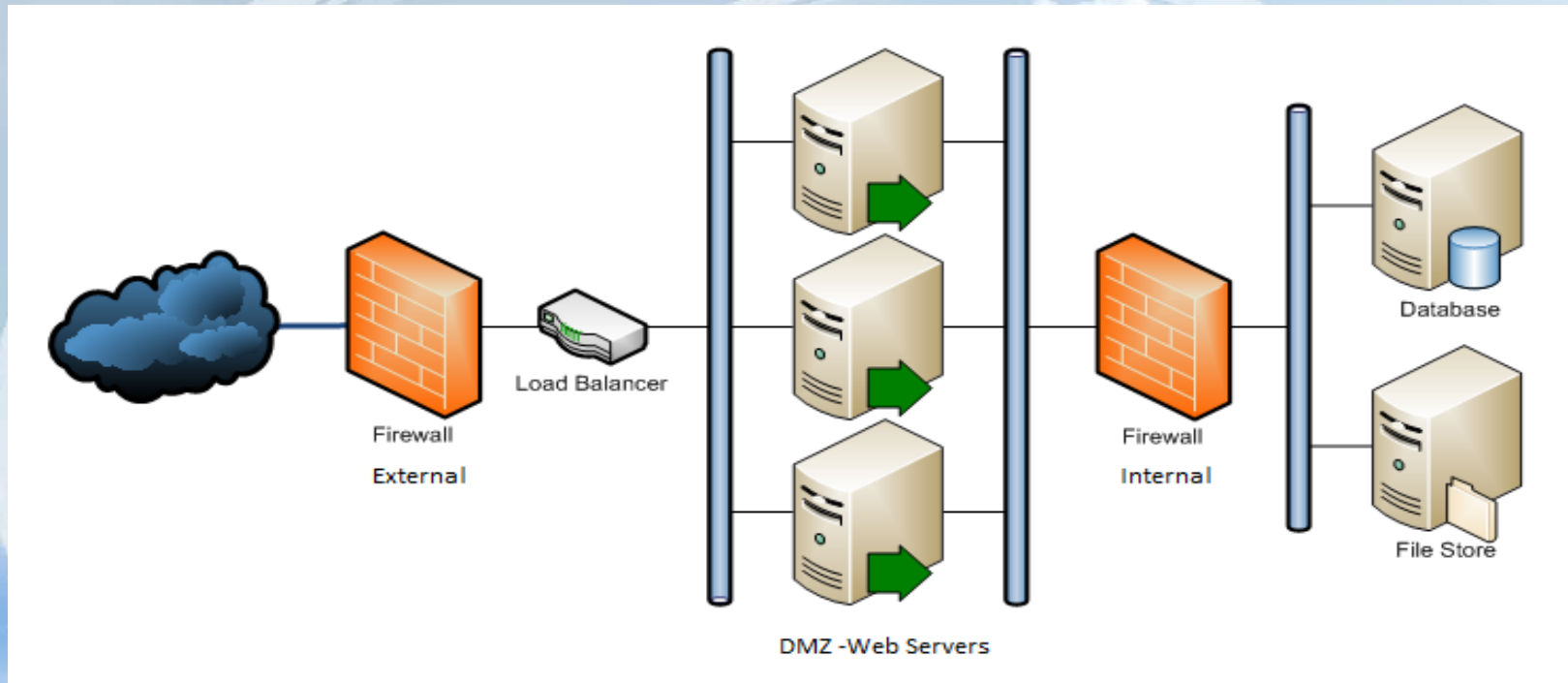
Protecting DC Hardware/Software infrastructure

- A **layered security** solution protects critical network resources that reside on the network.
- **If one layer fails, the next layer will stop the attack and/or limit the damages that can occur.**
- Firewall, Email Security, Web Security, Application Security, AntiVirus

Govnet CSIRT – incident response team.

Implementation of Information Security Management System and applying for ISO 27001:2013 certification in 2016.





- **External Firewall** – Controls Internet / WAN and DMZ traffics.
- **Internal Firewall** – It defined the internal access between Application Database and DMZ.



Load Balancing

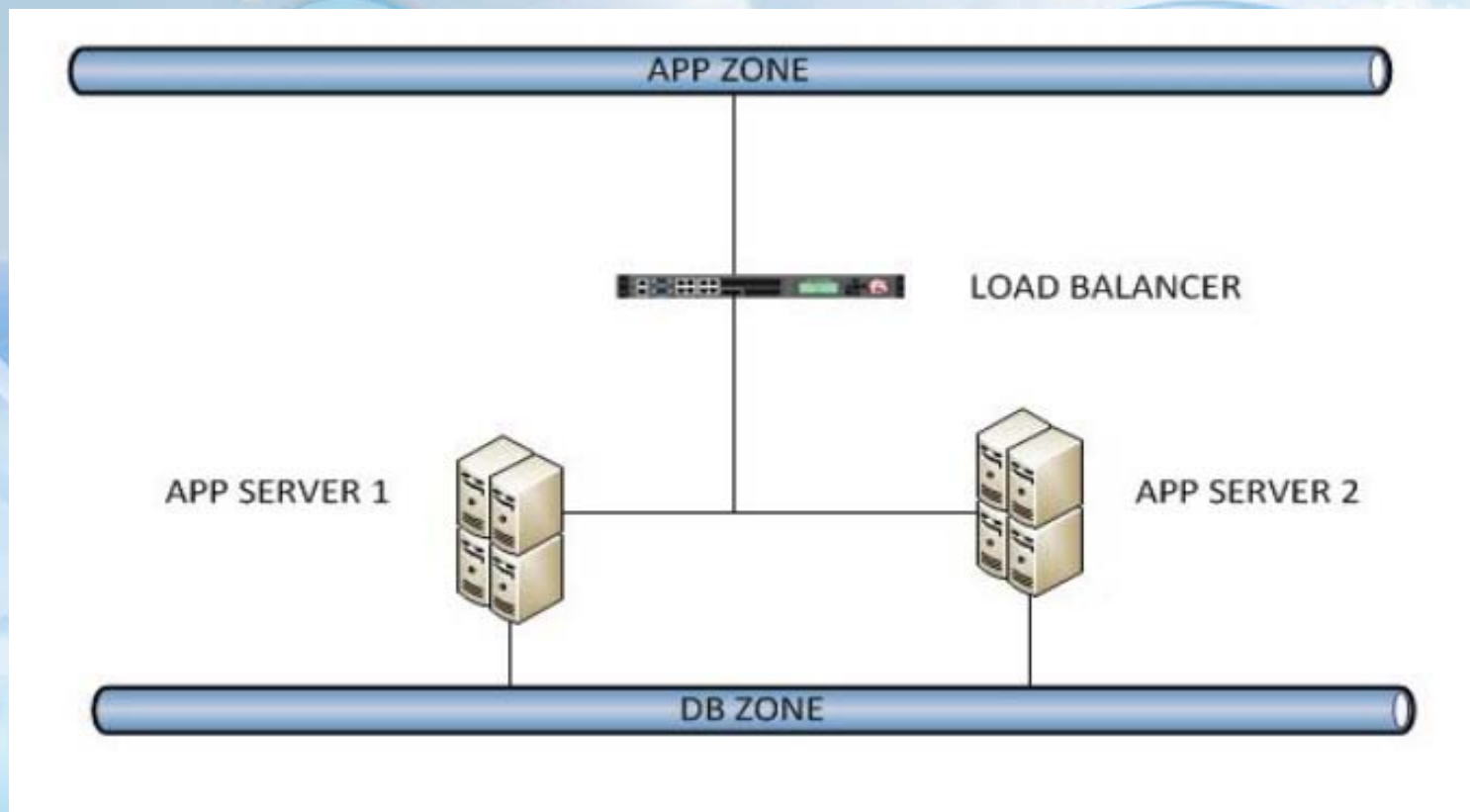
Load Balancer & Application-layer firewall

- At DC we use load balancing tools that *distributes network or application traffic across a number of servers.*
- ❖ Increase Capacity of user
- ❖ Reliability Of application
- ❖ Improve Overall performance of application
- ❖ **Decreasing the burden on servers associated with managing and maintaining application and network sessions.**
- ❖ Protecting specific application traffic such as web application & database.



Load Balancing at Web App and DB Zone

- We use a load balancer that distribute **Web and E-services** traffic across a number of servers hosting Web and Eservices.





Storage area network

Storage Area Networks (SANs)

We use high performance Storage Area Network (SAN) to connect servers and storage devices across network

Tiered Storage Architecture

- Our storage system architecture is based on tiered methodology. Tiered storage is a storage networking method where data is stored on various types of media based on performance, availability and recovery requirements.
 - ❖ **Tier 1** data (such as mission-critical, recently accessed, or top secret files) might be stored on expensive and high-quality media.
 - ❖ **Tier 2** data (such as financial, seldom-used, or classified files) might be stored on less expensive media in conventional storage area networks (SANs).
 - ❖ **Tier 3** system might contain event-driven, rarely used, or unclassified files on recordable compact discs.





Storage area network (cont'd)

Data Protection Services

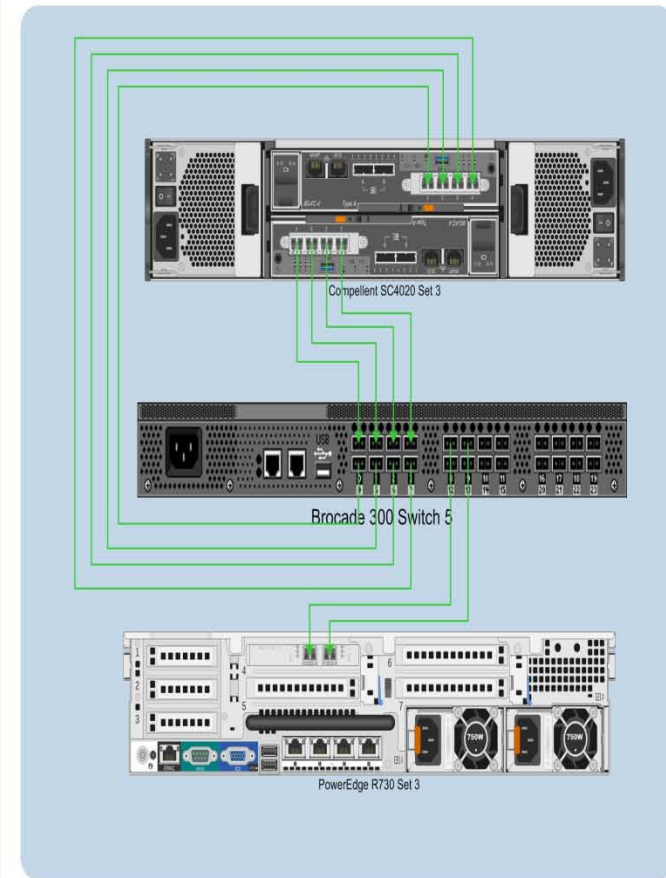
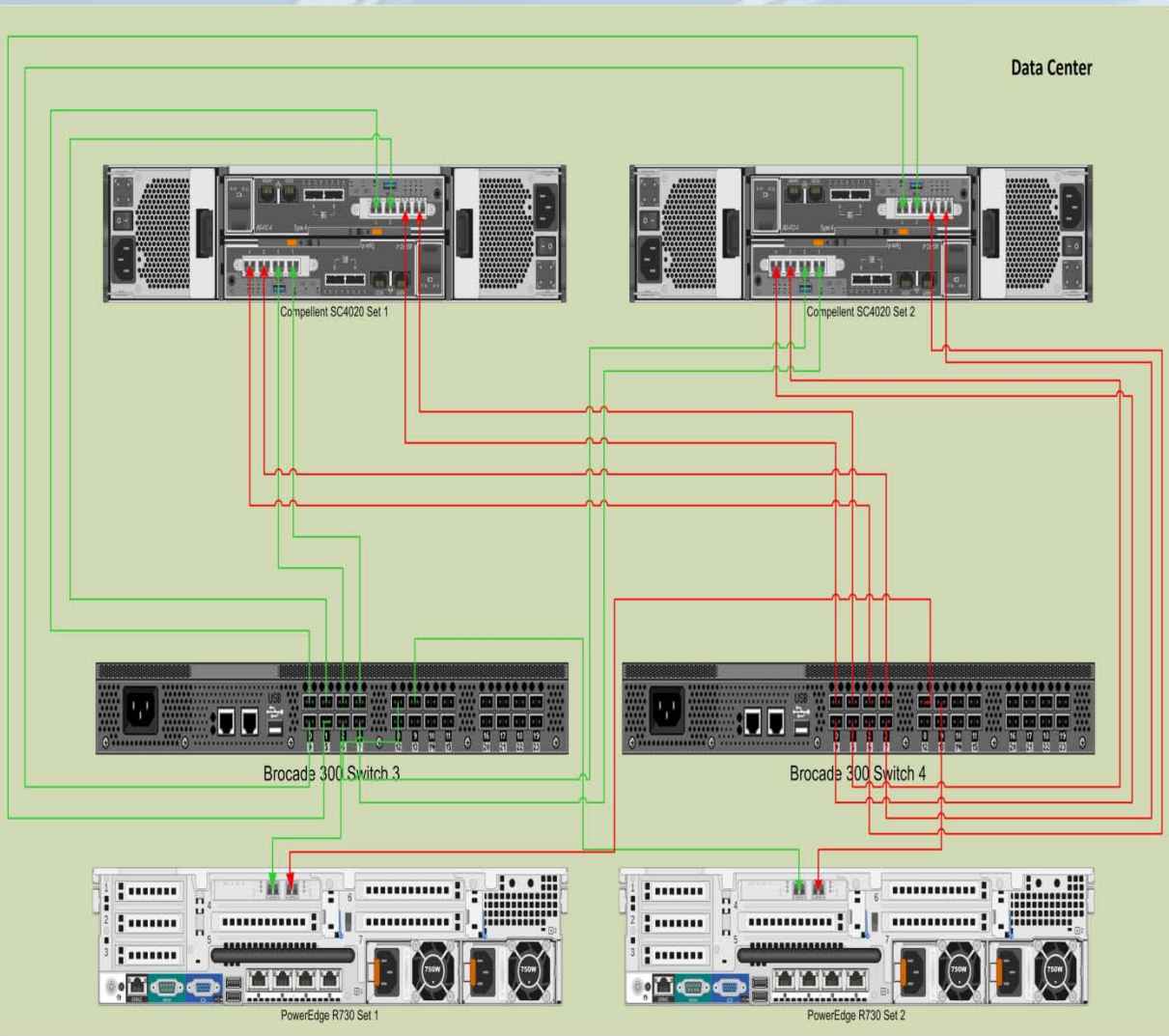
- Multiple servers can share storage for clustering and HA applications.
- Our Storage devices are capable of implement data protection services to move data to another storage device.
 - ❖ Synchronous data replication
 - ❖ Asynchronous data replication
 - ❖ Data snapshots
 - ❖ SANs also provide a set of configuration, directory, discovery and notification services to attached devices.





Storage area network (cont'd)

DC SAN Connectivity

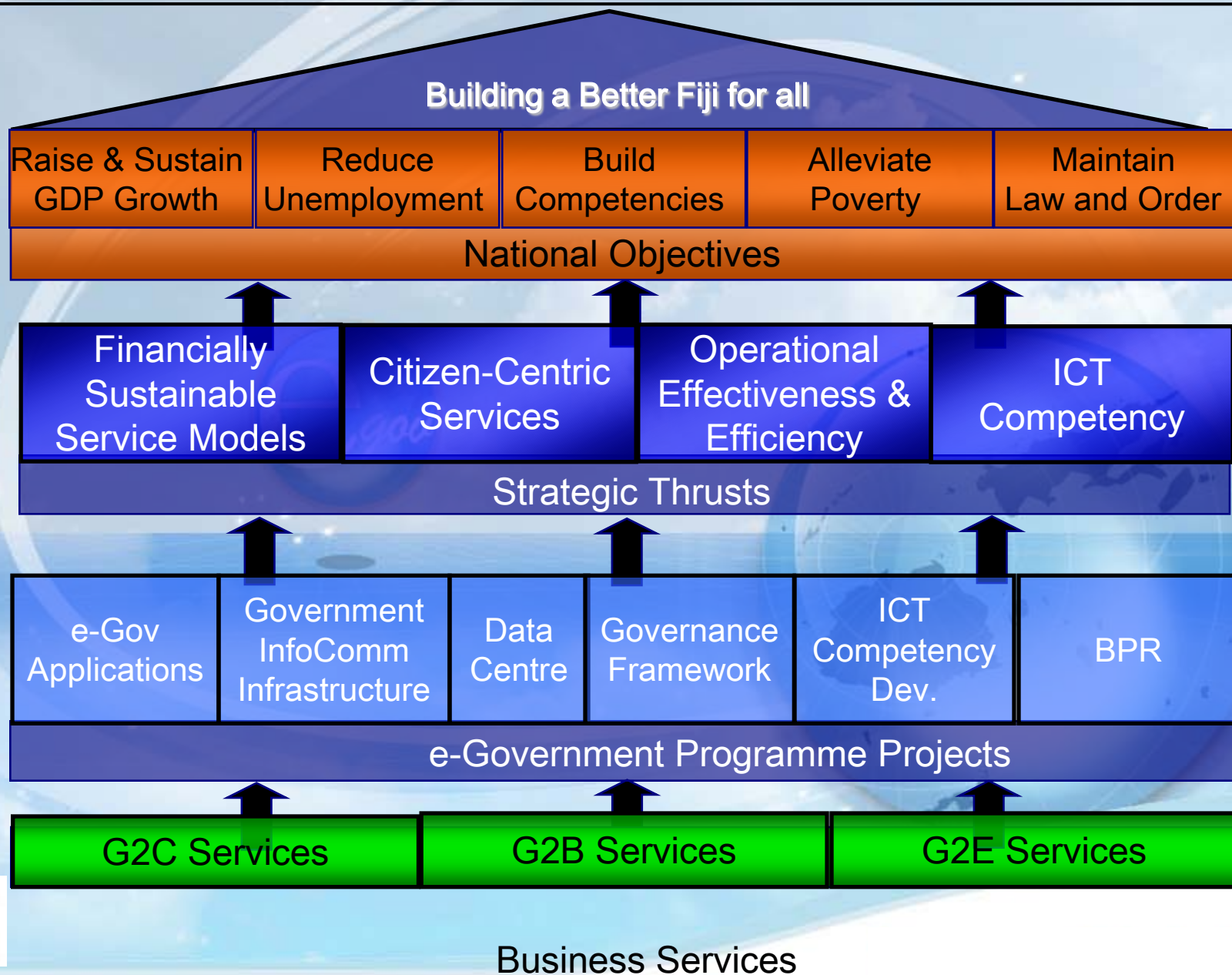




Government Enterprise architecture

- ITC Services is moving towards a customized enterprise architecture that will ensure
 - More consolidated support and software license management
 - Effective and efficient use of infrastructure with the maximum benefit
 - Government requirements for services is met
 - Cost savings







Vinaka!

