Data Center Constraints

Mitigation Strategy

Board of Directors

March 21, 2006

The Problem

- ERCOT Data Centers are nearing capacity
  - Power consumption
  - Cooling requirements
  - Floor space
- Upcoming projects are further driving up consumption needs
  - Fastrack
  - EMS upgrade
  - Nodal
  - Windows Domain restructuring
  - SCR745
  - Many others

Options

- 1: Enlarge existing data centers
- 2: Add another data center facility
- 3: Co-host Data Center
- 4: Optimize current data centers

- Immediate resolution: Optimize current data centers
    - Strategy has been developed
    - Minimal disruption to the organization
    - Will force ERCOT into long-term efficiencies
        - Reduce power/cooling costs
        - Lower O&M expenses in 2007 and beyond
        - Improve recovery capabilities
        - Simplify the operating model
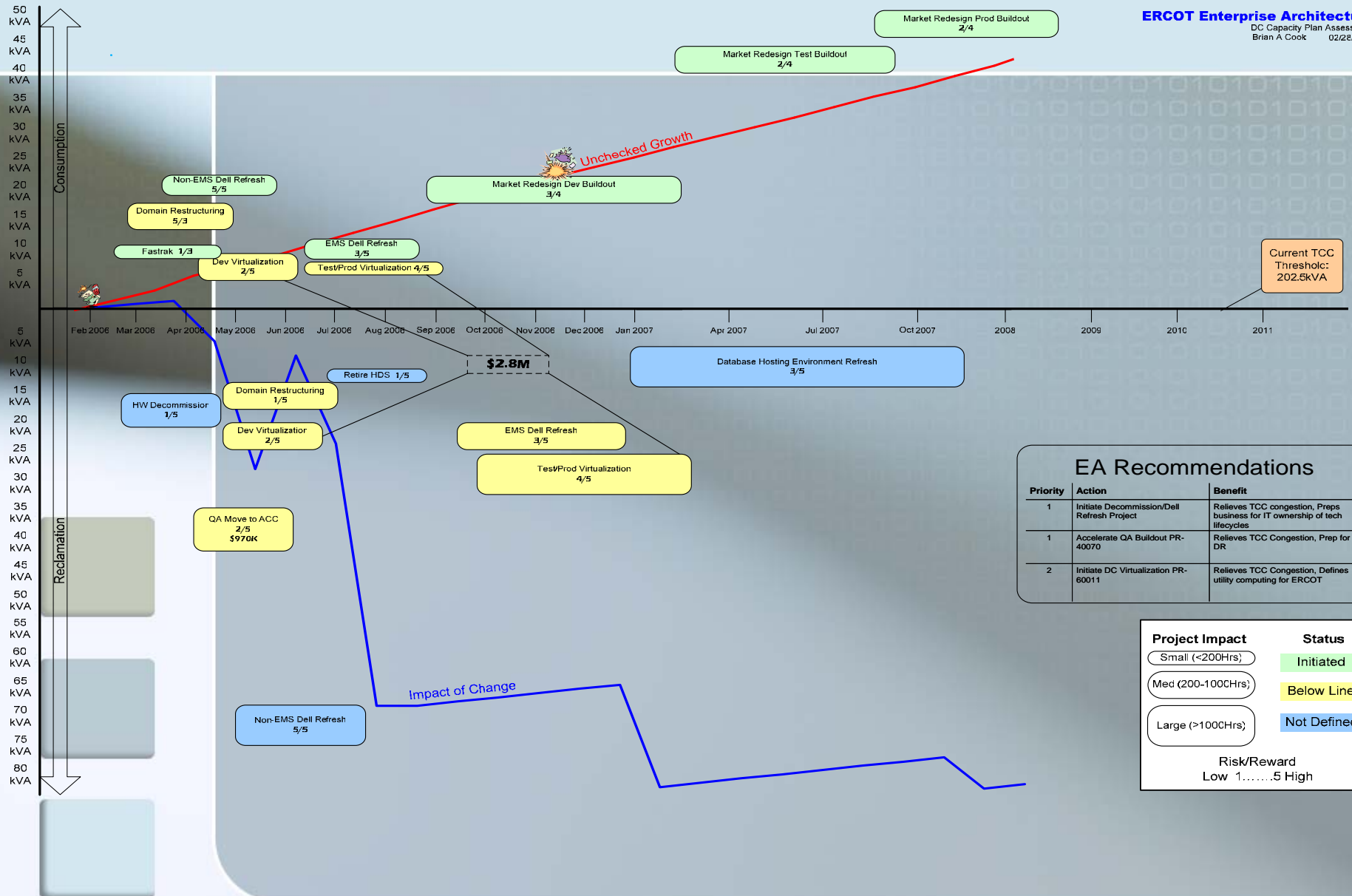
The Strategy

Servers

- Server optimization
- Decommission of old hardware
- Deploy newer technology

- Storage
  - Retire Hitachi system
  - Move to Disk-based backup
  - Data Center Virtualization
  - Information Life Cycle Management implementation
  - Business Continuity Solution
- Clarify Accountabilities

Accountabilities

- Capacity planning – Enterprise Architecture
- Disaster Recovery – Enterprise Architecture
- System performance – Operations and Infrastructure
- Reliability – Operations and Infrastructure
- Managing system changes – Operations and Infrastructure
- Business Systems quality - Application Services
- System Development Life Cycle – Application Services
- Data Center physical capacity – Operations and Infrastructure
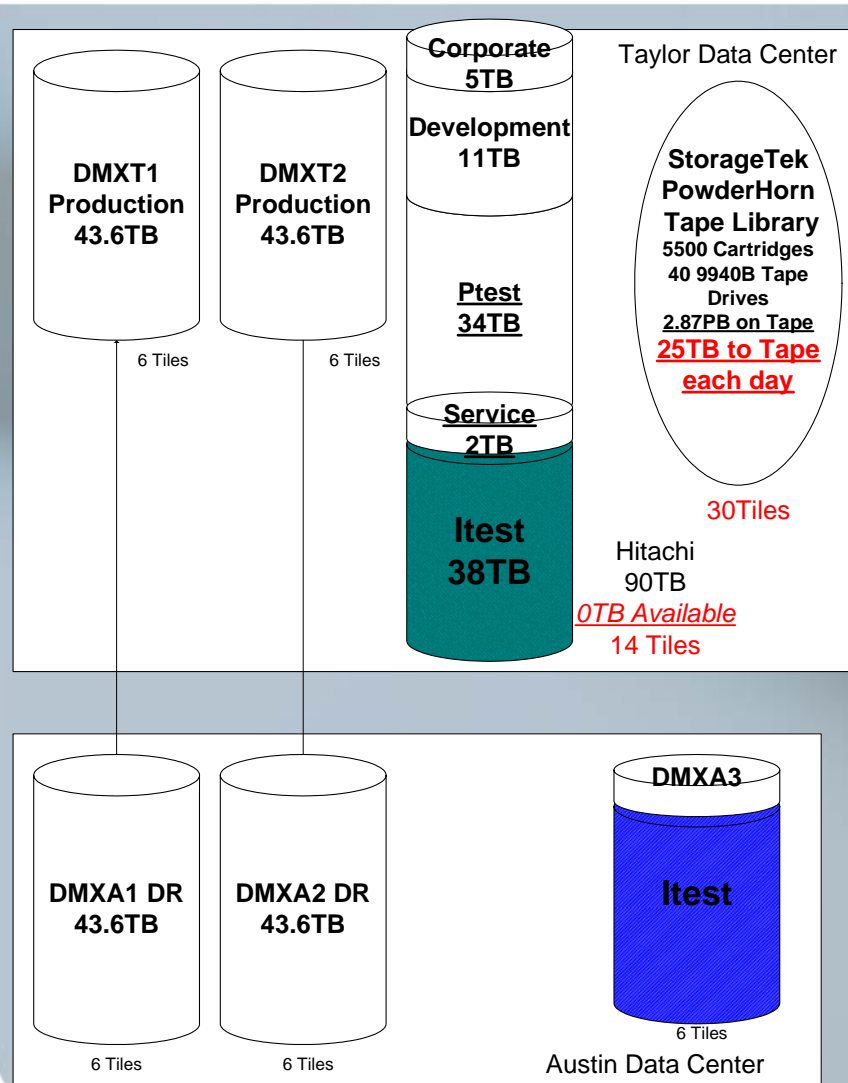- Service Agreements – Account Management

Server Strategy

Consumption axis (kVA): 50, 45, 40, 35, 30, 25, 20, 15, 10, 5

Reclamation axis (kVA): 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80

Timeline: Feb 2006, Mar 2006, Apr 2006, May 2006, Jun 2006, Jul 2006, Aug 2006, Sep 2006, Oct 2006, Nov 2006, Dec 2006, Jan 2007, Apr 2007, Jul 2007, Oct 2007, 2008, 2009, 2010, 2011

Market Redesign Prod Buildout 2/4

Market Redesign Test Buildout 2/4

Unchecked Growth

Market Redesign Dev Buildout 3/4

Non-EMS Dell Refresh 5/5

Domain Restructuring 5/3

Fastrak 1/3

Dev Virtualization 2/5

EMS Dell Refresh 3/5

Test/Prod Virtualization 4/5

Current TCC Threshold: 202.5kVA

$2.8M

Database Hosting Environment Refresh 3/5

Retire HDS 1/5

Domain Restructuring 1/5

Dev Virtualization 2/5

EMS Dell Refresh 3/5

Test/Prod Virtualization 4/5

HW Decommission 1/5

QA Move to ACC 2/5 $970K

Impact of Change

Non-EMS Dell Refresh 5/5

EA Recommendations

Priority	Action	Benefit
1	Initiate Decommission/Dell Refresh Project	Relieves TCC congestion, Preps business for IT ownership of tech lifecycles
1	Accelerate QA Buildout PR-40070	Relieves TCC Congestion, Prep for DR
2	Initiate DC Virtualization PR-60011	Relieves TCC Congestion, Defines utility computing for ERCOT

Project Impact
- Small (<200Hrs)
- Med (200-1000Hrs)
- Large (>1000Hrs)

Status
- Initiated
- Below Line
- Not Defined

Risk/Reward
Low 1.......5 High

Project 40070_01
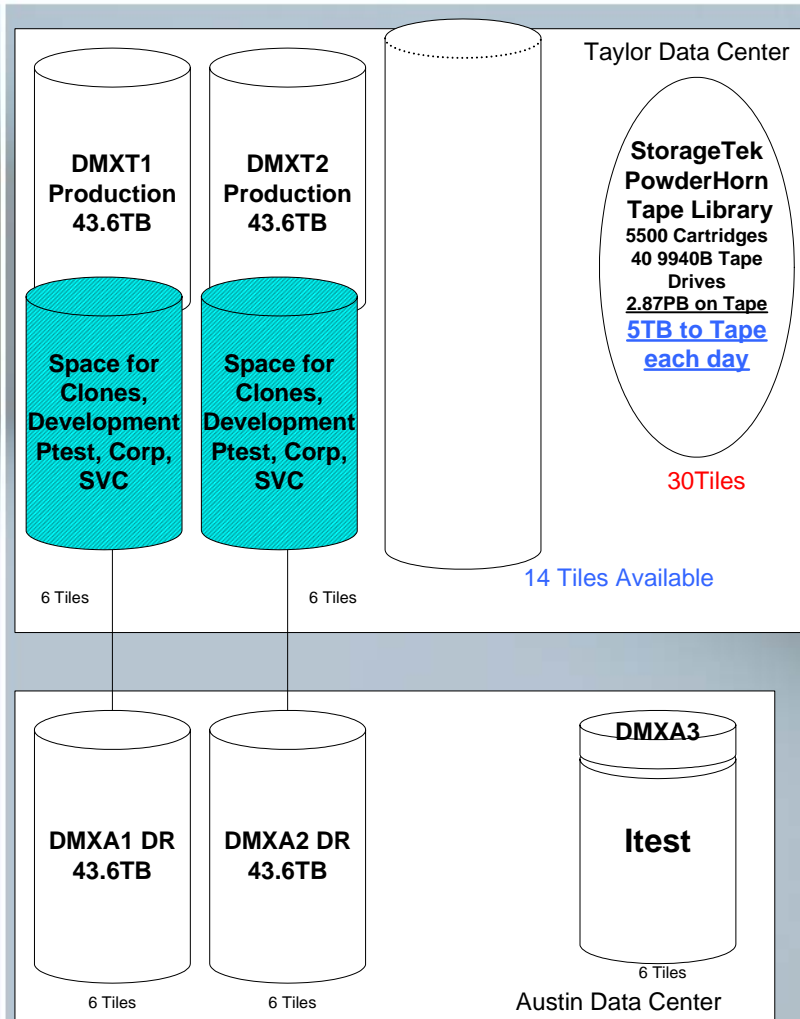# QA Environment

Requirements

- Purchase Disks, Cache, Tiered-Software

- **Benefits**

- Better Quality Testing

- Faster Refresh to Base Environment with Snapshots

- Itest Equipment Shared with Disaster Recovery

Taylor Data Center

DMXT1 Production 43.6TB

DMXT2 Production 43.6TB

6 Tiles

6 Tiles

Corporate 5TB

Development 11TB

Ptest 34TB

Service 2TB

Itest 38TB

StorageTek PowderHorn Tape Library
5500 Cartridges
40 9940B Tape Drives
2.87PB on Tape
25TB to Tape each day

30Tiles

Hitachi 90TB
0TB Available
14 Tiles

DMXA1 DR 43.6TB

DMXA2 DR 43.6TB

6 Tiles

6 Tiles

DMXA3

Itest

6 Tiles

Austin Data Center

Project 50027_01
Disk-Based Backup

Taylor Data Center

DMXT1 Production 43.6TB

DMXT2 Production 43.6TB

StorageTek PowderHorn Tape Library
5500 Cartridges
40 9940B Tape Drives
2.87PB on Tape
5TB to Tape each day

Space for Clones, Development Ptest, Corp, SVC

Space for Clones, Development Ptest, Corp, SVC

30Tiles

6 Tiles

6 Tiles

14 Tiles Available

DMXA1 DR 43.6TB

DMXA2 DR 43.6TB

DMXA3

Itest

6 Tiles

6 Tiles

6 Tiles

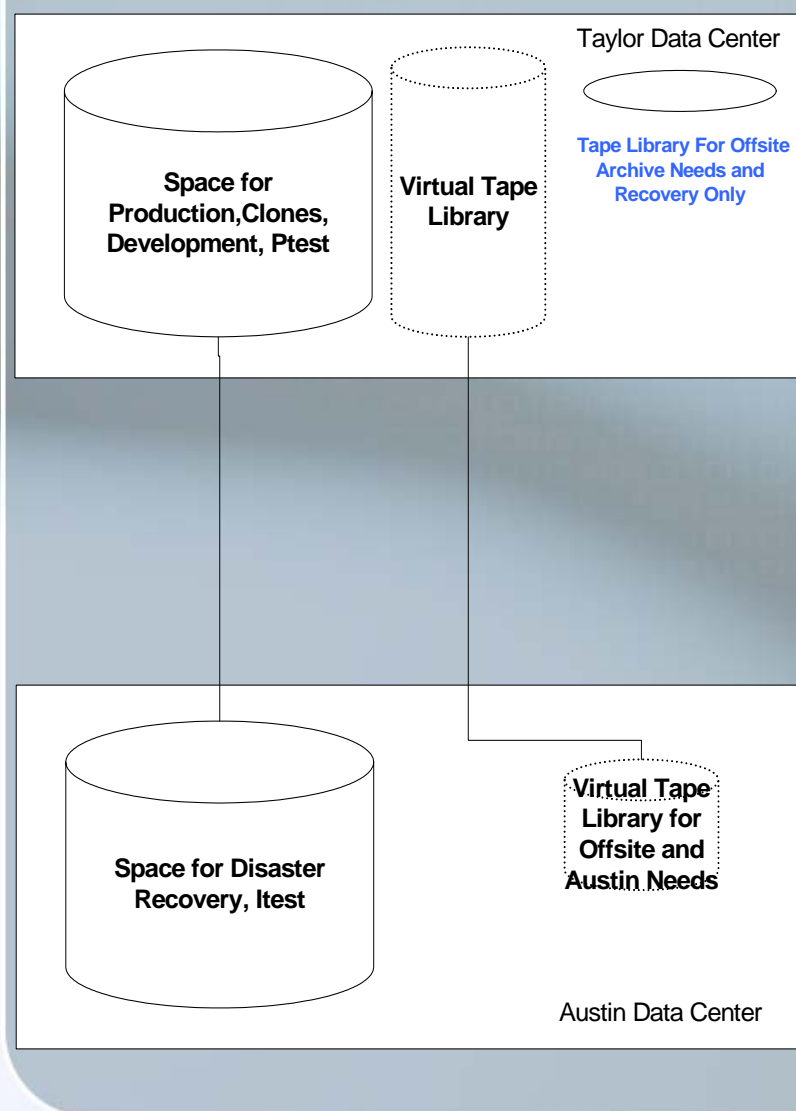**Austin Data Center**

Requirements

- Purchase Disks, Tiered-Software

Benefits

- Faster Recoverability

- Shrink Backup Windows

- Faster Refresh for Test Environments

- Shorten Testing Cycles

- Free-Up Hitachi Data Center Resources

  - O&M savings each year

  - Space, Power, Cooling

Project 60011_01
Data Center Virtualization

Taylor Data Center

Space for Production, Clones, Development, Ptest

Virtual Tape Library

Tape Library For Offsite Archive Needs and Recovery Only

Space for Disaster Recovery, Itest

Virtual Tape Library for Offsite and Austin Needs

Austin Data Center
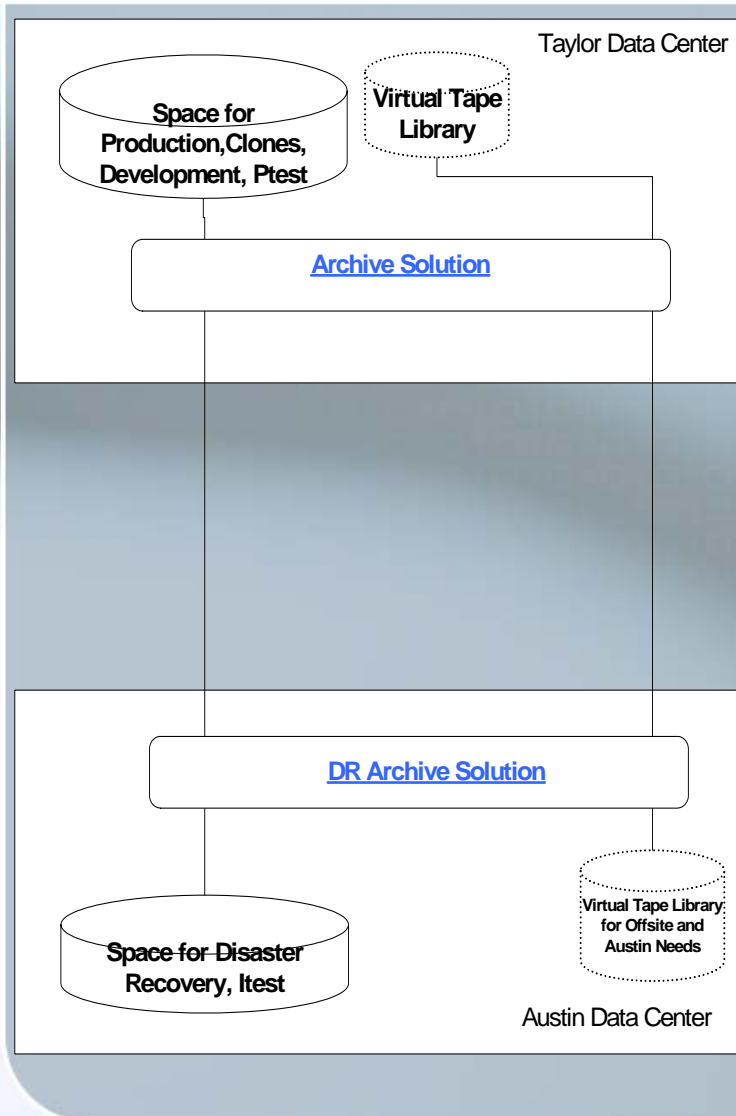
Requirements

- Purchase Arrays and Virtual Tape Libraries

Benefits

- Lower Data Center Power, Cooling, Space for Same Capacity

- Room For Growth

- Validate Nodal Project Requirements

- Faster File Restores

- Tiered Storage with Single Management

- Free up EMC O&M SW Burden

- Free-Up Powderhorn Data Center Resources

  - O&M Space, Power, Cooling savings

Project 60035_01
Information Lifecycle Implementation

Taylor Data Center

Space for Production,Clones, Development, Ptest

Virtual Tape Library

Archive Solution

DR Archive Solution

Space for Disaster Recovery, Itest

Virtual Tape Library for Offsite and Austin Needs

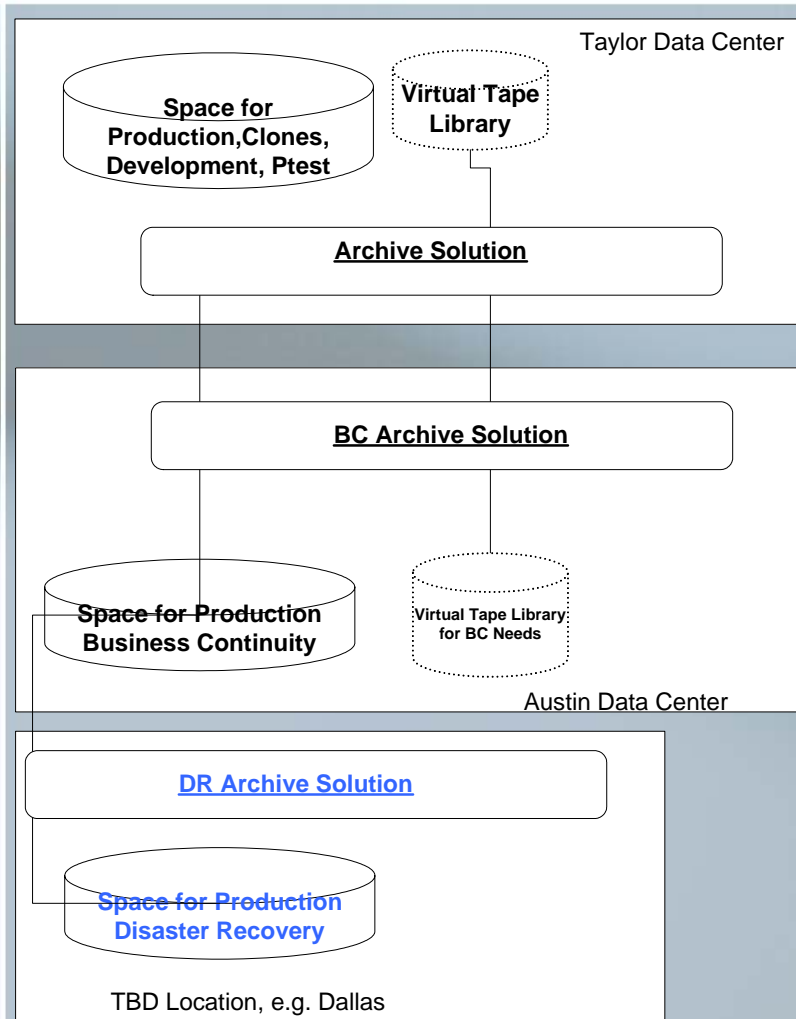Austin Data Center

Requirements

• Implement Archive Solutions

Benefits

• Compliance and Protocol Requirements Guaranteed

• Application SLAs Guaranteed

• Market Application Availability

  • e.g.,1TB Restore vs 100TB

• Production, Dev,Ptest,Itest, share same unchanging Data

• Removes Unchanging Data Replication Requirements

• Future Growth is Archive Capacity only

  • Tier 1 Requirements Recouped

• Potentially Eliminate Tape and its Risks

• Storage SLAs with Single Management

• Legal Data Authenticity and Retention Guaranteed

Project TBD
ERCOT Business Continuity Solution

Taylor Data Center

Space for Production, Clones, Development, Ptest

Virtual Tape Library

Archive Solution

BC Archive Solution

Space for Production Business Continuity

Virtual Tape Library for BC Needs

Austin Data Center

DR Archive Solution

Space for Production Disaster Recovery

TBD Location, e.g. Dallas

Requirements

- Implement Business Continuity Requirements

Benefits

- Availability SLAs

- Recoverability to TCC or Austin DC

- Ability to Test BC and DR