Testing Disaster Recovery

Troy Donoway
Salisbury University

November 9, 2012
Testing Disaster Recovery

- Importance of Testing DR Plans
- SU’s DR Strategy
- Testing DR
- Lessons Learned
About Salisbury University

- 8700 Students
- 4 Academic Schools
  - 42 Undergraduate programs
  - 14 Graduate programs
  - 1 PhD
- Salisbury, MD
  - 30 minutes from Atlantic Ocean
  - 2+ hours from Baltimore/Washington DC
Importance of Testing DR Plans

- How do you know you can recover?
- Your IT environment is constantly changing
  - Virtualization
  - New backup system
  - New LMS, SIS
- Peace of mind
Threats & Concerns

- Natural Disasters
  - Hurricanes, tornados, floods, earthquakes

- Social
  - Terrorism, employee error, hacking, viruses

- Technological
  - Power failure, hardware failure, software failure
Question #2

- What percentage of system outages are caused by natural disasters?
  - 3%

Five Reasons Why DR Plans Fail

- Lack of testing
- Plans out of date
- Procedures not detailed
- Required information not consolidated
- Lack of organizational readiness

(Hughes, 2012)
EDUCAUSE Core Data Service

- 87% of institutions have a data center disaster recovery plan in place.
- 76% of institutions have not tested their disaster recovery plans in the past year.

- 650 participants submitted data

(EDUCAUSE, 2012)
Exercise Types

- Plan Walkthrough
- Tabletop
- General Walkthrough
- Full-Scale
BC & DR Infrastructure
SU’s Infrastructure Strategy

- Primary Data Center
- Business Continuity (BC) Data Center
  - Foundation of production environment
  - Designed to recovery critical systems in less than 24hrs.
- Disaster Recovery (DR) Data Center
  - All backup data replicated 2.5 hours away
  - RTO – 2 weeks: RPO – last backup
- Encrypted backup tape (off-site facility)
  - Monthly backups
  - Last resort backup
Hardware Options for Testing DR

- 3rd Party
  - Dedicated – Fast recovery, very expensive
  - Shared – Slower recovery, less expensive
  - Cloud – many options, cost based on usage

- Use existing resources
  - Separate building on campus
  - Partner with another university
Different Test Scenarios

- Data exists in different locations.
- Tests must be conducted from each location to validate your DR strategy.
- SU has tested 2 of 3 scenarios
  - Primary Data Center failure
  - Complete failure of all 3 Data Centers
    - Restore systems from tape
Testing Primary Data Center Failure

- There are a number of strategies and options for testing Primary Data Center failure.
- Used our BC data center as the restore target.
- On our first test, we limited the scope to
  - SIS
  - Web presence
  - LMS
  - Email
Goals for Our First DR Test

- Restore all data and applications related to the University’s most critical systems.
- Test application performance and the integrity of the restore by end user-testing.
- Obtain metrics on the restoration of systems
- Refine procedures in our BC/DR plan.
Our Restore Environment

- BC Data Center is designed and configured to provide a foundation for our existing environment.
- SU isolated its BC Data Center network from the campus network
  - Domain controller, AD
  - Backup infrastructure
  - Disk-based deduplication appliance
  - DNS and other core networking services
Staging the Recovery Environment

- Moved backup environment
- Domain Controller & DNS
- Virtual resource pool
- Small storage array
- Email cluster
- Network equipment
- Laptops
Rebuilding Environment

- Configure domain services
- Restore VMs
- Email cluster “activated”
- End-user testing
BC & DR Infrastructure
Testing Data Center Failures

- All Data Centers have failed
- Restore from encrypted monthly backup tapes

Scope:
- SIS
- Web presence
- LMS
- Email
Goals for DR Test

- Restore all critical systems from encrypted tapes.
- Update DR plan to include detailed plans.
- Test application performance on backup systems.
- Obtain metrics on restoration process.
Staging DR Test Environment

- Setup a virtual resource pool with dedicated storage.
- Created an isolated network for DR test.
- Moved tape library to DR environment.
Restore Order for SU’s Environment

- Hardware (servers, storage & network)
- Setup virtual resource pool
- Configure a new VM for EKM (Encryption Software)
- Configure backup server
- Restore VMs
  - Restore Domain & network services
  - Restore web & DBs
  - Restore email
  - Restore SIS
  - Restore LMS
Customer Testing

- Very important to involve end-users
- Identify other resources needed
- Departments in our last test
  - Financial Services
  - Payroll
  - Provost’s Office
  - General Accounting
  - HR
  - Registrar
  - Admissions
  - University Police
  - Maintenance
  - Dining Services
## Test Results

### Business Continuity Site
- 2 hrs – email restored
- 7 hrs – financial
- 12 hrs – SIS
- 13 hrs – SU Websites
- 22 hrs – LMS

### Disaster Recovery Tape Restore
- 60 hrs – email restored
- 40 hrs – financial
- 40 hrs – SIS
- 32 hrs – SU Websites
- 50 hrs – LMS
DR Test Report

- Test Scenario
- Goals
- People involved with test and their role
- Detailed log of recovery events
- Lessons learned
- Action Plan/Follow-up items
- End-user test forms
Lessons Learned

- Interdependencies of systems
- Restore order of systems
- Details of restore process
- Network (NAS) drives needed
- BC hardware was inadequate
- Primary web server data drive too big
- Not all critical software “lives” in the DC
- Our backup software is not DR “friendly”
Suggestions for DR Exercise

- Laptops for systems & network teams
- Make sure wireless on laptop is disabled
- Create a nice working environment for test
- Celebrate accomplishments
Suggestions for Simplifying DR

- Virtualize
- Replicate VMs
- Cloud services
- Use team based cloud storage
  - Documentation and software
- Password management (encrypted)
Value of Testing DR

- Learning experience
- Verification of process
- Realistic expectations
- Peace of mind
Next Steps for your Institution

- Create the DR Plan
  - BIA
  - Identify RPO & RTO
- Design infrastructure to meet goals
  - Virtualize!!!
- Leverage relationships with other universities
- Explore opportunities with cloud technologies
- Test!!!
- Update the plan
References
