

How to develop a comprehensive and cost effective IT DR program

Most organizations understand the need for an IT disaster recovery (DR) plan. However, when planning for IT DR, many organizations frequently fail to develop a comprehensive DR solution.

While they typically plan for the required hardware and backup software, many organizations don't understand that a disaster recovery program, which includes the people and processes required to document the recovery procedures, test the procedures, execute the recovery at time of outage, and manage the ongoing lifecycle, is essential to ensuring successful IT DR. In effect, no 'set it and forget it' technology exists when it comes to DR. These organizations are not fully aware of all the expertise, tasks, and technology required to implement an effective plan, nor do they have a full grasp on all the costs involved.

This white paper details the critical elements necessary to put in place the three key components of a comprehensive IT DR solution: backup hardware, software, and the surrounding program. It then describes how selectively utilizing the services and capabilities of a DR specialist — for example, leveraging Sungard Availability Services' Managed Recovery Program (MRP) — may help reduce costs and improve the effectiveness of an IT DR program.

Three key components of a comprehensive IT DR solution: backup hardware, software, and the surrounding program

Hardware and software: The expected DR elements

When organizations think of IT Disaster Recovery and its total cost of ownership, they typically think of the hardware and software required to do backup. While the required hardware and software components of an IT DR program and their associated costs vary, they include the following:

Hardware

These costs include space and power, initial purchase costs, hardware and software upgrades, management and monitoring.

Space and power

Data center costs include space, cooling, racks, cabinets and cages, power, power distribution units, network infrastructure, network

cables, and IP addresses in each customer site where the backup infrastructure will be deployed.

Server purchase

This is the cost of the hardware on which the backup software resides. Depending on the configuration, hardware costs can include:

- Operating system software, when not included with the hardware
- Deduplication storage, when deduplication software is required
- Bare metal recovery hardware, which is held in reserve to speed DR and restoration. This must be kept up to date with all software, patches, etc., so that the organization doesn't need to spend time installing anything during an emergency — they can start the restoration immediately





- Standby backup server hardware — some do-it-yourself backup software vendors require duplicate standby server hardware at additional cost
- Tape infrastructure — some customers require seven year retention to comply with government regulations. Since disk storage is expensive, most organizations will turn to less expensive tapes to meet retention requirements.

Hardware upgrades

As storage needs grow, organizations must upgrade existing backup servers or add more servers, with the actual number depending on the rate of data growth.

Management and monitoring

IT resources are necessary to manage and monitor the hardware.

Data protection software

Data protection software costs include software, software maintenance, data movement appliances, space and power, management and monitoring, and networking costs.

Software purchase

Software costs include the cost of:

- Backup software licenses and upgrades
- Monitoring and reporting software
- Optional software, depending on the configuration, which may include deduplication software and bare metal recovery software.

Software maintenance

Organizations must pay ongoing annual maintenance fees for backup and deduplication software.

Appliances

The data mover transfers data from the production to the backup environment. Depending on the RTO/RPO objectives, the data movement technology might be a replication solution, a SAN, a disk for backup or a tape backup solution.

Space and power

Space and power is necessary for the backup appliance.

Management and monitoring

IT resources must be provided to manage and monitor all of the necessary software.

Network

The organization must implement and maintain the networking infrastructure.



The IT DR Program: A crucial, but not well understood, aspect of DR

While the hardware and software costs for disaster recovery are well understood, many organizations do not fully realize that in order to be assured of successfully executing the plan in the event of an outage or disaster, a comprehensive IT DR program must first be in place. An organization can have all the right IT DR hardware and software, but without a properly managed program, its efforts will fail. Even the organizations that do have this understanding often underestimate the complexities involved in creating an IT DR program and the associated costs.

The DR program consists of the people, processes and tools necessary to implement the IT DR solution and manage its lifecycle. Because this implementation process requires considerable expertise and experience, organizations must carefully consider the costs of developing their in-house skill sets as well as those of purchasing, implementing, and maintaining their own hardware and software in house. They should then compare this expertise and the hardware and software costs to those they could access by going to a third-party managed recovery provider that specializes in providing IT disaster recovery services.

Only by understanding what goes into a full IT DR program and the complete total cost of ownership (TCO) of both an in-house versus a “selectively outsourced” solution can organizations make the right choice.

The DR program consists of five processes: application mapping, developing disaster recovery

procedures, test planning and execution, post-test analysis, and recovery lifecycle management. The discussion below will address what each step involves, the labor resources and expertise required, and how a solution from a disaster recovery service provider can help simplify and improve the cost effectiveness of the process. [Table 1](#) details the costs involved in each step in the IT DR program when performed by the typical in-house operations and when performed by a disaster recovery specialist like Sungard AS.

Application Mapping to Determine Interdependencies

Organizations typically automate complex business processes using multiple interdependent applications and databases. The application mapping process connects each business process to all the application software and hardware required to deliver that process and assigns the process a desired recovery time/recovery point objective (RTO/RPO). To ensure that business processes are recovered within the desired timeframe, all the supporting applications must also be recovered within this time period.

Organizations perform application mapping through collaboration between IT and the business units to understand the business processes, and the applications, databases, and hardware that support the processes. IT and each business unit must then determine the cost of downtime. This requires assigning a dollar amount to each unit of time should an automated business process go down and how long the business can afford to be without this application.

Based on downtime costs, organizations can create recovery point objectives (RPOs) and recovery time objectives (RTOs) that specify how quickly the organization must recover each process should it go down. An example tiering of applications with their concomitant RTOs might look like the following:

- Tier 1: 0 – 4 hours RTO
- Tier 2: 4 – 12 hours RTO
- Tier 3: 12 – 24 hours RTO
- Tier 4: 24+ hours

All of the applications in the same process need to be assigned the same RPO/RTO. If organizations don't recover all of the interdependent applications and data necessary for a particular process at the same time, the entire process won't recover properly. For example, a Tier 1 application may rely on a seemingly less critical Tier 4 database. If this database is recovered more slowly (or not at all), IT directors will find themselves explaining to the Board why their recovery effort failed.

Depending on the organizations level of maturity, the application mapping process can take from 1–2 weeks to 1–2 months. Organizations have the choice of developing expertise in application mapping in-house or of using a solution from Sungard AS. A DR specialist like Sungard AS has the advantage of leveraging the considerable experience gained in prior implementations to complete this process faster for their customers.

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DO YOU FULLY UNDERSTAND THE COSTS OF IT DISASTER RECOVERY MANAGEMENT?

Recovery Procedure Development

Recovery procedures are the steps the organization must take to recover the data center and applications. Developing recovery procedures involves writing a detailed plan or run-book that defines how to deal with the loss of various aspects of the network (databases, servers, bridges/routers, and communications links). This script should include specifications for who will arrange for repairs or reconstruction, communication procedures for the initial respondents, and instructions on how the data recovery process should proceed. The script should also outline priorities for recovery (e.g. what should be recovered first). Once the repairs and data recovery have taken place, the procedures should include a checklist that organizations can use to verify that everything is back to normal.

These procedures need to follow best practices and be kept up to date. Many organizations do not spend enough time developing complete recovery procedures to make sure their data center is fully recoverable. For example, Sungard AS studies show that each application procedure takes approximately 19 hours to complete, and these procedures need to be continually updated based on production changes and testing results.

A DR specialist like Sungard AS can speed up and simplify the process of developing recovery procedures. For example, based on hundreds and even thousands of customer implementations, Sungard AS has developed a library containing thousands of best practices templates and modules. Instead of having to reinvent the wheel each time to develop test procedures, Sungard AS can take advantage of existing best practices-based procedures. Automated configuration

tools then arrange these templates and modules into a customer-specific "procedure." For example, Sungard AS' tool might start with the platform, such as Windows, then select the version (Win 2003), the Service Pack, the backup software version, and so on. Once the selections have been made, the tool finds the modules specific to the selection and arranges them into a PDF document.

Sungard AS' studies show that taking advantage of these best practices can significantly improve the quality of procedures while reducing the number of FTEs and peak staffing requirements as shown in Figure 1: Using a service provider like Sungard AS for disaster recovery can also significantly reduce costs. As shown in [Table 1](#), while Sungard AS charges a one-time set-up fee, organizations that develop procedures in-house not only incur sizable initial set-up costs, but also higher ongoing costs for updates.

Figure 1: Sungard AS can develop procedures more efficiently than organizations can in-house.

Recovery Procedure Development	SMALL BUSINESS		MEDIUM BUSINESS		ENTERPRISE	
	In-House	Sungard AS	In-House	Sungard AS	In-House	Sungard AS
Total Number of Procedures	4	4	50	50	150	150
Time Required to Develop Procedures (19 hours per procedure)	80 Hours	1 Workshop	1,000 Hours	1 Workshop	2,850 Hours	1 Workshop
FTE Requirements	.3 (Ongoing)	.02 (One Time)	.6 (Ongoing)	.02 (One Time)	2.5 (Ongoing)	.02 (One Time)
Requirements during peak times	1	1	1	1	1	1

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Test Planning and Execution

Best practice is for organizations to test their recovery plan at least once or twice a year. By testing the entire recovery process, organizations can determine whether their recovery plan works, as well as uncover problems, mistakes or errors, and resolve any problems before they impact an actual recovery effort. Such testing also educates staff in managing disaster recovery situations.

Many IT organizations, however, do not adequately test their DR plans. Executing recovery tests always involves removing production subject matter experts from their day jobs. This fact often leads companies to test subsets of their applications to minimize the disruption to the production environment. Less than full testing, however, is not sufficient to ensure successful recovery.

To develop an optimal plan, organizations should develop tests that consider everything that might

go wrong, come as close as possible to simulating a real-life incident, and have independent reviews and observers.

Test plans should include:

- Test goals to drive the tests and keep the process on track
- Execution scenarios that define the equipment, standard operating procedures, or conditions needed to conduct the test; test execution assumptions; and an event or incident scenario.
- Instructions to participants
- A communications directory with phone numbers, fax numbers, or email addresses of those whom the participants are likely to call
- A list of participants — including a test design team, simulation team, evaluators, test participants
- Test briefings
- Test debriefings
- Written evaluations and reports

Typically, these tests requires a sizable team (as shown in Figure 2) for test planning, startup testing, ongoing testing, and setup and teardown of the environment. Working with a DR partner like Sungard AS can reduce costs and improve effectiveness by using automation tools to set up and tear down the hardware used in testing ([See Table 1](#)).

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Figure 2: Test planning and execution requires a large number of resources. Automation developed by a DR specialist like Sungard AS can significantly reduce the necessary resources.

Test Planning and Execution	SMALL BUSINESS		MEDIUM BUSINESS		ENTERPRISE	
	In-House	Sungard AS	In-House	Sungard AS	In-House	Sungard AS
Time for Test Planning (hours)	50	20	50	20	50	20
Engineers Required for Test Startup (per shift)	9 Intel Engineers, 4 Mid-range Engineers	6 Intel Engineers, 3 Mid-range Engineers	17 Intel Engineers, 11 Mid-range Engineers	11 Intel Engineers, 8 Mid-range Engineers	86 Intel Engineers, 30 Mid-range engineers	57 Intel Engineers, 20 Mid-range Engineers
Test Team Required for Test	14 resources away from home site for 3 days	9 resources away from home site for 3 days	50 resources away from home site for 5 days	19 resources away from home site for 5 days	120 resources away from home site for 5 days	77 resources away from home site for 5 days
Setup and Teardown of Environment (hours)	80	0 (for the customer)	400	0 (for the customer)	768	0 (for the customer)
FTE Requirements	1.7	.03	3.1	.2	10.9	.7
Peak Requirements	14	1	29	5	118	16



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Post-Test Analysis

After testing, it's important to take the time to understand what happened during the test in order to optimize your recovery procedures. Organizations must examine detailed logs after each test to identify any errors in procedures,

eliminate the errors, retest the changed procedures, and then incorporate the changed procedures into the recovery plan, revising all existing disaster recovery documents. Organizations are often surprised to find that tests reveal significant gaps in their recovery scripts.

Working with Sungard AS can help to improve efficiency and reduce costs by providing standard work to ensure repeatable test execution. Figure 3 illustrates the amount of time this step typically takes to do in house, and how much time they can save with help from Sungard AS.

Figure 3: Time savings that Sungard AS can achieve when performing post-test analysis.

Post-Test Analysis	SMALL BUSINESS		MEDIUM BUSINESS		ENTERPRISE	
	In-House	Sungard AS	In-House	Sungard AS	In-House	Sungard AS
Time Required for Post-test Reporting and Analysis (hours)	30	0 (for the customer)	40	0 (for the customer)	80	0 (for the customer)
FTE Requirements	.06	0	.06	0	.1	0
Peak Requirements	1	0	1	0	1	0



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Recovery Lifecycle Management

Changes are constant in a production environment — software changes, patches are added, capacity grows and so on. Organizations need to manage the lifecycle to ensure that the changes flow into the backup and disaster recovery environments. If changes are not synchronized with the recovery systems and plans, the restoration of systems and data can be significantly delayed or even fail.

Many companies fail to manage and keep track of changes. Sungard AS can improve and simplify recovery lifecycle

management by providing specialists who understand and can help capture the production environment. These experts can apply best practices to analyze any changes to determine which ones will have an impact on the recovery site and then take appropriate action.

These experts can also save additional time and improve effectiveness by using recovery-specific configuration management tools. These tools facilitate change management by making it easy to document and communicate the changes. The tools can also standardize the information collected for certain asset

types. In addition, the tools create a workflow for changes to make sure all necessary parties are apprised of the changes. Either a customer or a Service Delivery Manager (SDM) can initiate the change, and the workflow communicates to both parties and obtains approval from the SDM. These tools also track the change history so that the customer or SDM can view old changes that have taken place at any time.

Figure 4 details the time savings Sungard AS can deliver using configuration management tools. [Table 1](#) illustrates the substantial cost savings.

Figure 4: Sungard AS’ expertise and configuration management tools can greatly speed up and improve the effectiveness of recovery lifecycle management efforts.

Recovery Lifecycle Management	SMALL BUSINESS		MEDIUM BUSINESS		ENTERPRISE	
	In-House	Sungard AS	In-House	Sungard AS	In-House	Sungard AS
Time Spent by Recovery Program Manager on Recovery Lifecycle Management (hrs/week)	4	1.5	8	5.3	16	8
Time Spent by Network, Platform, DBA and App SMEs Evaluating Changes and Making Updates (hrs/week)	1	4	2	1.3	4	2
FTE Requirements	1.3	0.5	1.5	1.0	2.0	1.0
Requirements during peak times	1	1	1	1	1	1

Organizations need to manage the lifecycle to ensure that the changes flow into the backup and disaster recovery environments. If changes are not synchronized with the recovery systems and plans, the restoration of systems and data can be significantly delayed or even fail.



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Table 1: TCO Evaluation of Internal DR Solution versus a Managed Recovery Program —
Small, Medium, and Enterprise Customers

Total Cost of Ownership Comparison	SMALL BUSINESS		MEDIUM BUSINESS		ENTERPRISE	
	In-House	Sungard AS	In-House	Sungard AS	In-House	Sungard AS
Program Costs						
Application Mapping	\$24,546 (One Time)	\$12,273 (One Time)	\$24,546 (One Time)	\$12,273 (One Time)	\$24,546 (One Time)	\$12,273 (One Time)
Procedure Development	\$28,995 (One Time)	\$1,964 (One Time)	\$63,788 (One Time)	\$1,964 (One Time)	\$278,347 (One Time)	\$1,964 (One Time)
	\$3,107 (Annual)	\$0 (Annual)	\$6,834 (Annual)	\$0 (Annual)	\$29,823 (Annual)	\$77,196 (Annual)
Test Planning	\$121,518 (Annual)	\$1,661 (Annual)	\$128,448 (Annual)	\$25,650 (Annual)	\$1,549,419 (Annual)	\$0 (Annual)
Post-Test Analysis	\$6,627 (Annual)	\$0 (Annual)	\$6,627 (Annual)	\$0 (Annual)	\$9,941 (Annual)	\$0 (Annual)
Recovery Lifecycle Management	\$142,242 (Annual)	\$56,762 (Annual)	\$170,960 (Annual)	\$113,524 (Annual)	\$228,397 (Annual)	\$113,524 (Annual)
MRP Costs	\$0 (Annual)	\$144,000 (Annual)	\$0 (Annual)	\$300,000 (Annual)	\$0 (Annual)	\$864,000 (Annual)
Total One-time Costs	\$53,540	\$14,236	\$88,334	\$14,236	\$302,893	\$14,236
Total Annual Costs	\$273,494	\$202,423	\$612,870	\$439,174	\$1,817,580	\$1,054,720
Hardware Costs						
Space	\$50,160	\$0	\$130,320	\$0	\$441,600	\$0
Power	\$61,618	\$0	\$170,035	\$0	\$522,576	\$0
Servers	\$453,583	\$0	\$1,200,910	\$0	\$3,948,346	\$0
Hardware Maintenance	\$51,002	\$0	\$153,007	\$0	\$408,019	\$0
Mgmt. and Monitoring	\$156,000	\$0	\$343,200	\$0	\$1,497,600	\$0
MRP Costs	\$0	\$147,546	\$0	\$378,102	\$0	\$1,309,440
Total Annual Costs	\$772,363	\$147,546	\$1,997,472	\$378,102	\$6,818,141	\$1,309,440
Backup Software Costs						
Backup Software	\$100,000 (One Time)	\$100,000 (One Time)	\$220,000 (One Time)	\$220,000 (One Time)	\$960,000 (One Time)	\$960,000 (One Time)
Backup Appliances	\$186,810 (Annual)	\$163,050 (Annual)	\$373,520 (Annual)	\$326,100 (Annual)	\$1,494,480 (Annual)	\$1,304,400 (Annual)
Mgmt. and Monitoring	\$35,220 (Annual)	\$35,220 (Annual)	\$155,100 (Annual)	\$77,580 (Annual)	\$281,760 (Annual)	\$281,760 (Annual)
Network	\$77,550 (Annual)	\$38,790 (Annual)	\$71,340 (Annual)	\$71,340 (Annual)	\$620,400 (Annual)	\$310,320 (Annual)
Backup Space and Power	\$35,670 (Annual)	\$35,670 (Annual)	\$70,440 (Annual)	\$70,440 (Annual)	\$281,760 (Annual)	\$281,760 (Annual)
Total One-time Costs	\$100,000	\$100,000	\$220,000	\$220,000	\$960,000	\$960,000
Total Annual Costs	\$335,250	\$272,730	\$670,500	\$545,460	\$2,682,000	\$2,181,840
TOTAL ONE-TIME COSTS	\$153,540	\$114,236	\$308,334	\$234,236	\$1,262,893	\$974,236
ANNUAL TCO	\$1,381,000	\$623,000	\$3,281,000	\$1,363,000	\$11,318,000	\$4,546,000



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Conclusion

As we have seen, the total cost of ownership using a selectively outsourced DR solution from Sungard AS — the Managed Recovery Program — can be significantly lower than in-house solutions for a wide range of organizations. Lower hardware and software costs are due to Sungard AS' ability to achieve economies of scale when acquiring technology for use by a large number of customers as well as their specialized expertise in implementing and maintaining these solutions.

Sungard AS can also reduce costs for the program by making investments in automation technologies, including libraries and templates of run books and procedures, that dramatically reduce the time it takes to develop procedures. At the same time, the expertise, pre-developed procedures, and automation technologies that Sungard AS brings to the table helps to greatly improve the overall effectiveness of the IT DR program.

For more information please visit our website at:
www.sungardas.com/Solutions/DisasterRecovery/ManagedRecovery/Pages/ManagedRecovery

Additional reading



[Managed Recovery Program](#)



[What's in a Business Continuity/Disaster Recovery Plan Template?](#)

About Sungard Availability Services

Sungard Availability Services provides disaster recovery services, managed IT services, information availability consulting services and business continuity management software.

To learn more, visit www.sungardas.com
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