

# iSeries High Availability: Why it Has Become So Affordable and Easy to Use

A White Paper



## Until recently...

iSeries high availability solutions were reserved mostly for large enterprises. Now that high availability is dramatically easier to use and less expensive to own and manage, the picture has changed. Thousands of small and mid-sized companies can now afford to cost-justify the “luxury” of rapid, complete data recovery.

Interestingly (and fortunately), this shift is occurring when downtime is causing more of a disruption and expense to businesses than ever before (much more about this shortly). With technology costs dropping and downtime costs skyrocketing, companies have a huge incentive to evaluate iSeries high availability technology.

### RPO vs. RTO

Before looking more closely at the cost factors of high availability (HA)—and why each has changed so significantly—it is helpful to first understand the concepts of recovery-time objectives (RTO) and

recovery-point objectives (RPO).

The graph in Figure 1 shows a variety of common iSeries business continuity technologies in which one axis indicates the time it takes to recover data after a failure/disaster (RTO), and the other axis indicates the completeness of data that is ultimately recovered (RPO).

At the low end of the disaster recovery (DR) spectrum is tape backup (basic availability) and at the high end is high availability (HA)—a process more technically known as logical data replication-plus-switchover (LDR+Switch), which rapidly moves users and processes to a fully mirrored secondary server in order for it to assume all or most of the functions of the production server.

Unfortunately, the perception of most mid-size and small companies is that although HA technology is the “Cadillac” of DR solutions, it simply cannot be cost-justified. Just a few years ago that might have been true, but today the story is very different.

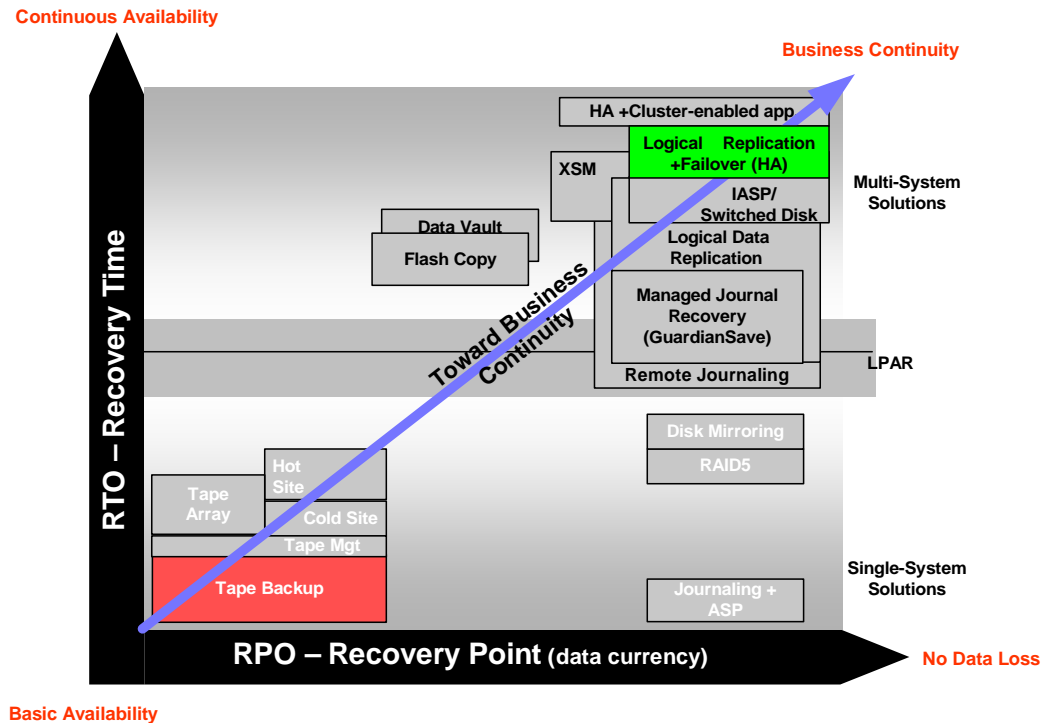


Figure 1 – RPO and RTO and the spectrum of iSeries DR solutions/strategies.

## Factors of High Availability Costs

High availability is certainly not “cheap” when you consider all of the components that are needed, but what has changed is how the cost of each of these factors—for its own reasons—has dropped. Here’s the major components of HA:

- *Hardware* - A second iSeries machine is needed with enough capacity to accommodate replicated data and its demands. For instance, depending on how fully you want to run your mirrored applications from the backup environment during planned and unplanned downtime, this machine may need to handle the transaction volumes and devices supported by the production machine.
- *Communication Bandwidth* – If the second iSeries machine is located offsite, which is necessary to have true disaster recovery protection, then sufficient communication capacity is needed to accommodate the amount of data flowing to it from the production machine.
- *High Availability Software* – This necessary software executes, manages, and monitors the replication or mirroring of designated business-critical data to the backup machine. It also provides the ability to efficiently move users and processes to the backup machine during downtime events. The cost of HA software also needs to take into account annual maintenance contracts and installation and training costs.
- *High Availability Management* – Staff time is required each day to monitor and manage the data mirroring processes to ensure mirrored data is accurate and useable when needed. The amount of time needed for this task depends on your environment

and the self-managing capabilities of the HA software.

## Decreasing Cost of Hardware

It’s no secret iSeries machines pack a lot of bang for the buck, and the current configurations and pricing models of the iSeries make buying a second machine for high availability is significantly less than it was a few years ago.

If you intend to replicate data only for disaster recovery purposes (not to run applications during downtime on the backup machine but only to be able to retrieve the data from it), an economical option is to buy a smaller iSeries model with enough horsepower to handle replication. Many companies can get by with a smaller machine with enough capacity to run critical applications for a short amount of time for a limited number of high priority users. Several machines now offer Capacity-on-Demand features that allow you to engage extra processing power when it is needed (i.e. after a switchover).

If you are considering replacing your current iSeries with a newer model, an excellent way to extend the value of the older machine is to use it as the backup machine in a high availability environment (instead of selling it for pennies on the dollar).

Many options are available today to lease a partition on a larger iSeries from a service provider such as a DR company, value-added reseller (VAR), or even the HA vendor itself. Some of these companies will sell the entire HA package as a service on a cost-per-month basis, effectively transforming HA from a capital expenditure to a monthly expense.

## Decreasing Cost of Communication Bandwidth

Many companies wisely choose to locate the backup machine at alternate sites from a few miles to hundreds of miles away. This helps to assure continuous availability in the unlikely event of a site disaster. Of course, the number and size of transactions determines the size of the needed communications pipeline in order to minimize transaction backlog (transactions waiting to be transmitted to the backup system).

The cost of communications bandwidth has greatly decreased in recent years, which is good news for companies needing full disaster recovery benefits from its HA solution.

## Decreasing Cost of High Availability Software

The cost of HA software used to vary

tremendously from vendor to vendor with the newest vendors typically charging the least for their software. In general, competition has driven down the cost of HA software to a point where it costs a small fraction of what it did just a few years ago.

## HA Core Competencies

Because HA software costs significantly less than it used to, you'll want to make sure you are getting necessary features and support for the price. In addition to talking to vendors when evaluating HA products, it is particularly valuable to talk to customers of the different HA vendors. If possible, talk to a customer who has used more than one HA product.

## Decreasing Cost of HA System Management

With many software applications, it often costs more to manage the software than to

### *iSeries High Availability Core Competencies*

#### **Important questions to ask vendors and their customers when evaluating HA software**

- On average, how long does it take each day to monitor and manage the system?
  - It should rarely take more than half an hour a day. Be sure to verify this from several customer references
- How well does the HA solution audit objects to ensure both environments are truly in sync?
  - Audits for data should include a continuous, record-by-record comparison between the production and backup environments
  - The auditing process should include all necessary objects including IFS
- Is the HA solution self-correcting and self-healing (does it have autonomic capabilities) when object discrepancies are found? If so, can objects be automatically corrected at the record level?
- Are the replication of large objects, spooled files, IFS, device configurations, data areas, scheduled jobs, data queues, job queues, and the jobs within job queues supported?
  - The replication of IFS should occur incrementally at the record level where possible
- Does the product provide automated object replication management (i.e. automatic object creation, deletion, moving, renaming)?
- Does the solution use natively incorporated remote journaling or is remote journaling retrofit into the product?
  - Native remote journaling improves the efficiency of the replication process.
- Is the switchover process (moving users and processes to the backup machine during downtime on the production machine) easy to execute as well as fast and reliable?
  - Customer references should be provided by an HA vendor in which the switchover process is successfully tested at least once per quarter (once per month is better)
  - Customer references should verify that a *complete* switchover is performed; in other words, the customer runs their mirrored application(s) on the backup environment for an extended time
  - The HA software should execute the actual switchover of the systems within minutes (of course, additional time will likely be needed to physically move users, communications, and interfaces)
  - One or more customers should be able to attest to a successful "failover" (system failure on the production environment causing an unscheduled switchover)
  - Analysis tools should be included in the software that gives operators confidence that all necessary replicated components are current
- Can customer references confidently endorse the quality of technical support and services that they receive? How many support calls are made on a weekly and monthly basis?

purchase it. The same can apply to high availability software, but the amount of time required can vary tremendously depending on the product. New-generation products with the latest autonomic (self-healing, self-managing) technologies can reduce the amount of manpower needed to monitor/manage the product to half an hour or less per day. Products that require an operator to pour through reports and manually find and repair objects that are out of synchronization can tie up staff for 20 or more hours per week. Of course, the more time it takes, the higher your total cost of ownership.

### The Autonomics Difference

Here are typical ways that self-healing, self-managing HA products save time:

- Object auditing processes are performed automatically by the product and the results of the audits are shown on easy-to-read screens. It is critical that operators can quickly see the status of replicated object integrity. If a problem requires operator attention, the source of the problem must be quickly determined. An operator should never spend time searching for the source of problems within the various journaling and communications screens of the OS/400 operating system, nor have to write special queries or programs to verify HA replication integrity.
- If an object needs resynchronization for any reason, the problem is automatically detected and corrected by the software. This self-healing process is even more effective if it is able to detect and repair discrepancies at the *record* level instead of re-copying entire objects when synchronization problems are detected.
- Objects don't lose synchronization when they are renamed or moved to a different library
- Objects don't have to be manually synchronized when they are first created.
- Remote journaling is natively incorporated in the architecture allowing the mirroring process to occur more efficiently and on both the production and backup systems.

## Dropping Cost of HA Ownership

### How it adds up...

Given all of the ways that the cost of high availability has decreased, the total cost of ownership is significantly less than it was just a few years ago:

- A software license for full-featured (not "lite") HA typically costs 30% to 70% less than it did a few years ago. This equates to a savings of \$20,000 to \$150,000 depending on the size of your environment
- Because the software license cost is so much less, annual support/maintenance fees are also significantly less. Over five years, savings on maintenance fees can range from \$30,000 to \$150,000
- The cost to monitor and manage HA software is reduced dramatically when only half an hour or less is required instead of a half-time to full-time person. This saves tens of thousands of dollars each year.
- A second iSeries machine for HA purposes costs many thousands less than it did just a few years ago; plus, IBM regularly offers discounts when a machine is purchased with high availability software. Alternatively, service companies will lease a partition for a backup environment on a dollars-per-month basis.
- The cost of communication bandwidth has plummeted. A few years ago, the cost of bandwidth was 10 to 20 times higher than it is today.
- Some service companies offer a turn-key HA package including software, installation, a backup environment, and will even manage your HA all on a dollars-per-month basis. This shifts HA from a capital expenditure to a monthly expense.
- Leasing: when the cost for hardware, software, installation/training, and maintenance are rolled into an IBM three-year FMV lease, the whole solution can cost as little as \$50 a day!

***The bottom line:*** *The total cost of ownership for iSeries HA is tens of thousands to hundreds of thousands less than it was only a few years ago!*

## The Rising Cost of Downtime

Now that you have a better understanding of the cost of high availability, let's take a closer look at the costs and causes of downtime to see how quickly your investment in HA can be recouped.

Time windows when the system can be restricted in order to perform system maintenance tasks are shrinking. For many IT shops, the luxury of scheduled downtime has disappeared altogether. This can primarily be attributed to three factors that keep stretching the length of the business day: 1) economic conditions dictate that companies do more with less by moving new workloads to off-hours rather than buying additional systems, 2) the globalization of business requires many companies to be available for longer hours, and 3) the need for companies to deliver various Internet-related capabilities creates 24x7 business conditions.

The downtime discussion used to be about planning for site disasters or system failures. In reality, the largest durations of downtime are attributed to system maintenance tasks. In fact, only five to ten percent of all downtime is caused by unplanned events and only ten percent of that (about one percent of the total) is due to site disasters. The other 90+ percent comes from the following:

- Data backups (nightly, weekly, and monthly saves)
- Reorganization of files to reclaim disk space and improve performance
- Vendor software upgrades & data conversions
- IBM OS release upgrades & PTFs
- New application software installations
- Hardware upgrades
- System migrations

Every hour that a system is unavailable—whether from planned or unplanned events—causes significant costs to be incurred to a business...often far more than you think. Plug your numbers into the following back-of-the-envelope formula to get a general idea of the total annual direct and indirect cost of downtime:

*Take the business lost during an hour of system downtime (whether from planned or unplanned downtime) during business hours, then add the total hourly wage (including all benefits) of all employees that are idle during that hour of downtime. Now multiply this figure by the estimated number of hours of system downtime during a year. Finally, multiply the result by 2 to take into account the costs of this lost employee productivity, lost business reputation, and lost business—both now and in the future—from your lost customers.*

Despite the fact that the largest cause of downtime is from planned events, and the iSeries is considered one of the most reliable systems available (some studies have put its reliability at 99.95%), it's vital to put unplanned events into the equation. Simply stated, unplanned events that stop access to business-critical systems for an extended period can cost many businesses dearly and can even spell doom for a business. According to US Bureau of Labor, 93% of all companies that experience 'significant data loss' are out of business within five years. Consider the following from the IBM Redbook, *Clustering and LASPs for Higher Availability on the IBM eServer iSeries Server*:

*"According to one IBM study, the iSeries server averages 61 months between hardware failures. However, even this stellar record can be cause for availability concerns. Stated another way, 61 months between hardware failures means that nearly 67 percent of all iSeries servers can expect some type of hardware failure within the first five years."*

Given the above, it is a safe bet that you will face a significant system failure or site disaster more than once during your career. When companies take a realistic look at downtime costs—both planned and unplanned—a high availability solution quickly pays for itself.

### Conclusion

It is a fortunate change of events for the SMB-sized shop that the powerful business-continuity technology of high availability is

no longer reserved for the largest enterprises. Because of dropping hardware and communications costs, the dropping cost of HA software, a host of self-healing and self-managing capabilities making HA simple to run, plus new options to purchase HA as a cost-per-month service, thousands of companies that used to precariously rely on tape backups as their sole disaster recovery strategy can easily cost-justify the “Cadillac” of disaster recovery solutions.



iTera, Inc.  
801-799-0300  
[info@iterainc.com](mailto:info@iterainc.com)  
[www.iterainc.com](http://www.iterainc.com)

© Copyright 2003-2006, iTera, Inc. No portion of this document may be reproduced without permission from iTera, Inc. IBM, eServer, and iSeries are trademarks of International Business Machines Corporation. All other trademarks are property of their respective companies.

Rev. 020106

### Additional iSeries high availability white papers available from iTera:

- *Introduction to iSeries High Availability*
- *The Benefits of Remote Journaling in iSeries High Availability*
- *Exploding the Six Common Myths of iSeries High Availability*
- *Next Generation High Availability and DR Technologies*

To obtain these white papers, please contact iTera at 1-800-957-4511 or visit [www.iterainc.com](http://www.iterainc.com).