

High Availability

Written by: **Jonathan Hillier, Solutions Director**

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T 0870 11 22 000
F 0870 11 22 001
www.teamsolve.co.uk

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1. Introduction

To ensure your organisation is as competitive as possible in today's ever changing marketplace, you need IT systems and applications that are ever present. User productivity is paramount for any business and with technological advances there is no reason why man-hours need to be lost through server crashes, or application malfunction.

There are many core business operations which can be critically affected by loss of IT services, including - but not limited to:

- Transaction loss
- Business interruption amongst key players such as customers, suppliers and employees
- Delays in time to market
- Customer apathy - error messages and failure of systems is frustrating and can lose valuable customers

High availability isn't a new way of thinking; however it is only in recent years that innovation has paved the way for a truly integrated high availability solution that can cross historically conflicting operating systems, applications and servers.

With true high availability, it is no longer necessary to think of servers and systems as separate. Problems are automatically detected and seamlessly addressed, switching to alternate sources with no system downtime and no disruption to productivity.

High Availability

1.1 - High Availability as a Service Level Metric

Systems that are not highly available, can cost your organisation time and money. In a 24/7 environment, 99% availability of a system will result in over 3 days of system downtime over a year, during which time customer orders may be missed or staff may be unable to access financial information.

The following diagram (fig.1) perfectly highlights how improving the availability of your infrastructure can dramatically reduce the minutes, hours and days productivity you lose due to system downtime.

Percentage Availability	Downtime Per Year (7x24x365)		
	Days	Hours	Minutes
95%	18	6	0
99%	3	15	36
99.9%	0	8	46
99.99%	0	0	53
99.999%	0	0	5
99.9999%	0	0	1

1.2 - Business Drivers of a True High Availability System

There are a number of internal and external factors which drive forward the need for a true high availability system.

High Availability

1.2.1 - 24/7 Economy

With the development of technology has come the explosion of the 24/7 economy. E-commerce systems need to be live throughout the night; business is international with time differences having to be managed through capable IT systems. Communication is on the move, mobile and wireless technologies have been adopted by mainstream business. With many businesses relying more on technology for a sale and the people making the sale, system downtime can hit turnover hard. High availability ensures all the communication protocols of your organisation are up and running, 24 hours a day – 7 days a week.

1.2.2 - Accident & Emergency

There are all manner of situations where network or system downtime can result in a huge cost to your organisation. Natural disasters such as hurricanes and floods can be a potential wipe-out for an organisation's IT systems. A fire in the server room, or a clumsy employee tripping on a power cable - historically, all these events could have been a serious problem for an company's IT infrastructure, but high availability will ensure your systems stay live, whatever happens.

1.2.3 - Legal Regulation

In recent years compliance has become a huge issue for every business, everywhere in the world. Companies are spending billions every year on meeting health, safety, employment and environmental requirements, which adds up to a huge cost to the business for no obvious return. If you operate across national boundaries you may need to meet multiple regulations, with multiple currencies and metrics. The increasingly onerous requirements placed on business can be more easily met if they are supported by effective, highly available systems that are able to share and pool data, enabling access to near real time information as and when required.

High Availability

1.2.4 - Information is King

Data recovery varies from program to program, with a margin of anything between 1 minute for payment processing applications and 1 hour for more complex systems. Every company in the world now has more data to store, less time to manage and streamlined budgets to support the increased strain on systems. With a high availability system, information is always available, increasing productivity and efficiency whilst reducing the time spent on system management.

1.2.5 - Globalisation

Increasingly global and international operations put communication and IT at the forefront of a business' function. Supply chains spreading across the continents, off-shoring and an increase in mobile working have created a necessity for availability at satellite and remote offices, as well as a need for convergence between IT operations all over the globe.

High Availability

1.3 - Benefits of a High Availability Infrastructure

- Increase efficiencies - a more stable, robust architecture will make operations within your business environment more efficient
- Maintain competitive advantage - If your system is running at maximum availability, you are maximising your exposure to the marketplace. When competitors' systems fail, your infrastructure remains in place - keeping you one step ahead.
- Avoiding loss of revenue or employee productivity. Lost revenue from system downtime will vary depending on the company and industry, but it could be a significant financial downfall. More and more companies are also measuring staff time and charge out rates; periods of employee inactivity will mean a significant rise in those figures.
- Safeguard stakeholder satisfaction - Not having immediate access to information when it's required is frustrating for employees, senior management, suppliers and distributors. Having highly available systems builds confidence in an organisation's ability to deliver, maintains staff morale and provides real-time information for senior decision makers and directors.
- Helps build customer loyalty. Customers expect to be able to log-in to purchasing systems or extra-net servers as and when they require. System downtime is frustrating for customers, employees and suppliers alike, it can damage brand reputation and significantly damage an organisation's relationship with internal and external stakeholders.

2. Grid Computing and RAC - a True High Availability Solution

Grid computing is a notion originally lifted from the electricity industry. If a power shortage is identified in one particular station, then electricity will be sourced from elsewhere and there will be no disruption to end user supply. In grid computing, if a server goes down mid-operation then another server will pick up the workload instantly, significantly reducing downtime and reliance on technical staff. This has enabled organisations to achieve high availability and better resource management within IT operations.

RAC (Real Application Clustering), Oracle's solution to high availability provides the framework and implementation technology to run a database from multiple servers. Using Oracle 10g, usually time consuming matters like adding or removing servers in to the clusters can be done with ease. Peaks of demand are easily accommodated for with the ability to quickly scale up or down depending on the level of business activity. Oracle's 10g Database with RAC ensures you make the most efficient use of your hardware to support the core business operations.

High Availability

2.1 - RAC in Action

RAC ensures systems are robust and highly available by providing backups for server failure without any disruption to the overall infrastructure. As shown in fig.2, in the event of a problem with one server, resource is switched automatically to another server - ensuring your systems stay live whilst maintenance is carried out on the original fault.



3. Six Steps to True High Availability

1. **Economic servers** - The raw power of high availability as a notion means all networks must be robust and capable of dealing with peaks and fluctuations in traffic. However, the resilience of high availability comes from the number of machines, rather than the numbers of power supplies or CPU's in a server system. Therefore, purchase the maximum number of 'economy' servers your budget will allow, rather than purchasing fewer, more expensive servers with specifications that will not be used.
2. **Consistency of core software installations** – Modern day Grid software will ensure that the right job goes to the right platform; it can also recognise the diagnostics and operating systems. It may however, be more difficult to know which Oracle drivers are installed on a particular system. Conformity of drivers and software libraries across platforms will make the processes run smoother.
3. **Managing change** - People naturally resist change and a shift to grid computing processes will affect the way a business is run, how it is managed and the day-to-day tasks of many employees. Highlight the potential time savings and increased efficiencies - both are major factors that can seriously improve an organisation's performance.
4. **Be structured in its introduction** - Find tasks within your organisation with processing requirements that are well suited for the Grid. Demonstrate the successes and benefits of Grid Computing, using a phased approach, rather than trying to switch processes straight away.
5. **Education, education, education!** - Educate senior management and employees on the long- term competitive advantages that Grid Computing will provide. Educate programmers and developers on the benefits and ease in implementing Grid applications. Educate the support staff on the ease of managing a Grid infrastructure.
6. **Integrate with existing processes** - Grid Computing works best when it complements existing systems, as it helps the change management process and reduces the alienation that new solutions can bring.

4. Teamsolve - Experts in Highly Available Systems

Since 1996 Teamsolve has been providing the very latest Oracle solutions and services. Our unrivalled expertise covers the entire Oracle product suite including the Oracle database (v6-10G), Oracle's Application Server, Collaboration Suite, development tools (iDS), Fusion middleware and Oracle's application software - the E-Business Suite (v9 - 11i).

Teamsolve are one of a select few Oracle Certified Advantage Partners on both Database and E-Business Suite. Teamsolve built and continue to support the first Oracle 10G Real Application Cluster (RAC) reference site in Europe. As Oracle Certified Advantage Partners on Database we know how to make Oracle work for your business.

We have offices in both Derby and London and have clients all over the UK and world. Contact us today for more tailored information on how Teamsolve can improve your business productivity, streamline your IT procedures and boost your service levels.

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