

Database Availability for DB2 LUW

Contents

Introduction.....	3
The Cost of Database Outages	3
Database Availability & Business Resilience for DB2	4
Phase 1 – Evaluation.....	5
Phase 2 – Design.....	6
Technology Solutions Overview	6
Phase 3 – Implementation	7
Customer examples.....	8
Conclusion.....	9
About Triton Consulting.....	10
Bibliography	10

Introduction

Can you be sure that your availability and recovery plans are robust and able to meet business SLAs?

Data sits at the heart of all organisations and without it everyday functions simply cannot be performed. Whether your organisation is a large Fortune 500 or SME, reliance on data availability is growing. It is vital to ensure that your organisations' Data Availability and Recovery procedures are robust and able to meet business SLAs.

In today's 24/7 environment organisations are expected to have services available around the clock. IT teams are under increasing pressure from the business and ultimately from customers who expect to be able to access services at any time. The fallout from a serious database outage can be disastrous for organisations and for those individuals who are tasked with keeping data available.

The Cost of Database Outages

The cost of database outages can be measured in many ways:

- Lost sales revenue
- Lost customers
- Reputational damage
- Regulatory and compliance implications
- HR implications

In whatever way you measure the cost of a database outage there will always be a negative financial effect on the organisation. Having systems offline can have a range of effects depending on your industry. From not being able to process sales orders to users not being able to perform their job roles, the potential loss of money and time is a major concern. If an organisation is unfortunate enough to hit the headlines with a major outage then the PR fallout can be catastrophic with the potential of alienating existing and new customers for good.

Industry examples

According to Dunn & Bradstreet, 59% of Fortune 500 companies experience a minimum of 1.6 hours of downtime per week. Below are some recent examples of database outages which have caught the attention of the press:

US State Department – In July 2014 the US State Department experienced severe database performance problems including outages. In a statement to InformationWeek they stated that the system “crashed shortly after maintenance was performed.” The system is not directly accessible by the public but caused serious issues for staff and ultimately for customers who could not have passports and visas processed.

Walgreen Pharmacy – In August 2014 the American pharmacy chain Walgreen experienced a major database outage which affected their pharmacies countrywide and blocked customers from filling prescriptions. The crash occurred during a routine database update. The entire system had to be shut down after problems occurred during the update.

Adobe – In May 2014 Adobe experienced a 27-hour outage in its' Creative Cloud suite, used by many organisations and individuals in the creative industry. The failure occurred during database maintenance activity. This left users unable to work and resulted in a backlash of bad PR for the company.

O2 – In 2012 the UK mobile operator O2 experienced two separate faults due to issues with its Central User Database. In July 2012 millions of customers were unable to call, text or use mobile internet services for more than 24 hours. As a result the company was forced to offer subscribers a

10% discount on their bill and subsequently decided to spend £10m to replace the Central User Database.

RBS – In 2012 Royal Bank of Scotland suffered a software issue which left millions of customers unable to access their accounts. In a widely publicised ruling by the Financial Conduct Authority RBS was fined £56m as a result.

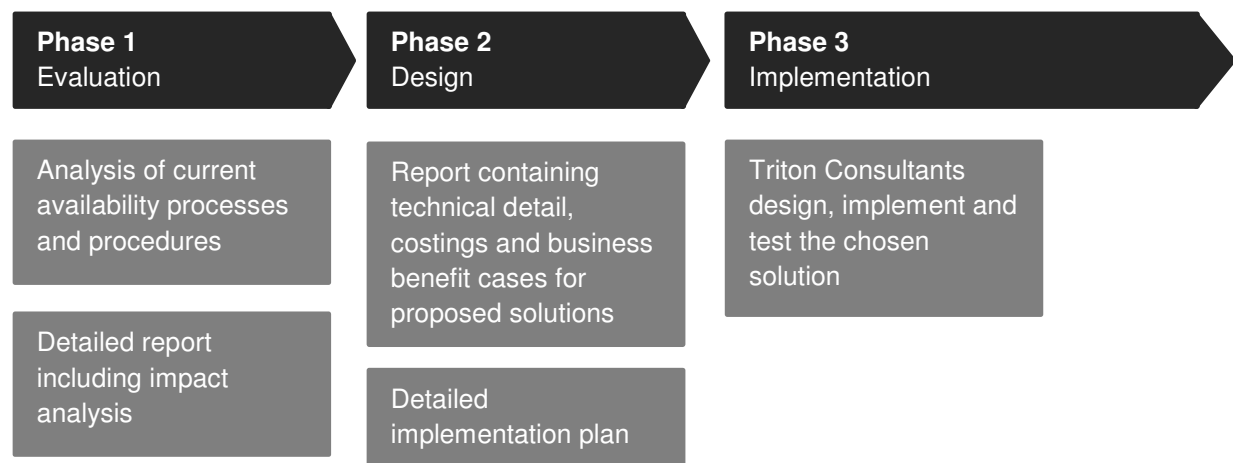
[See bibliography for reference details.](#)

Database Availability & Business Resilience for DB2

There are two challenges to face:

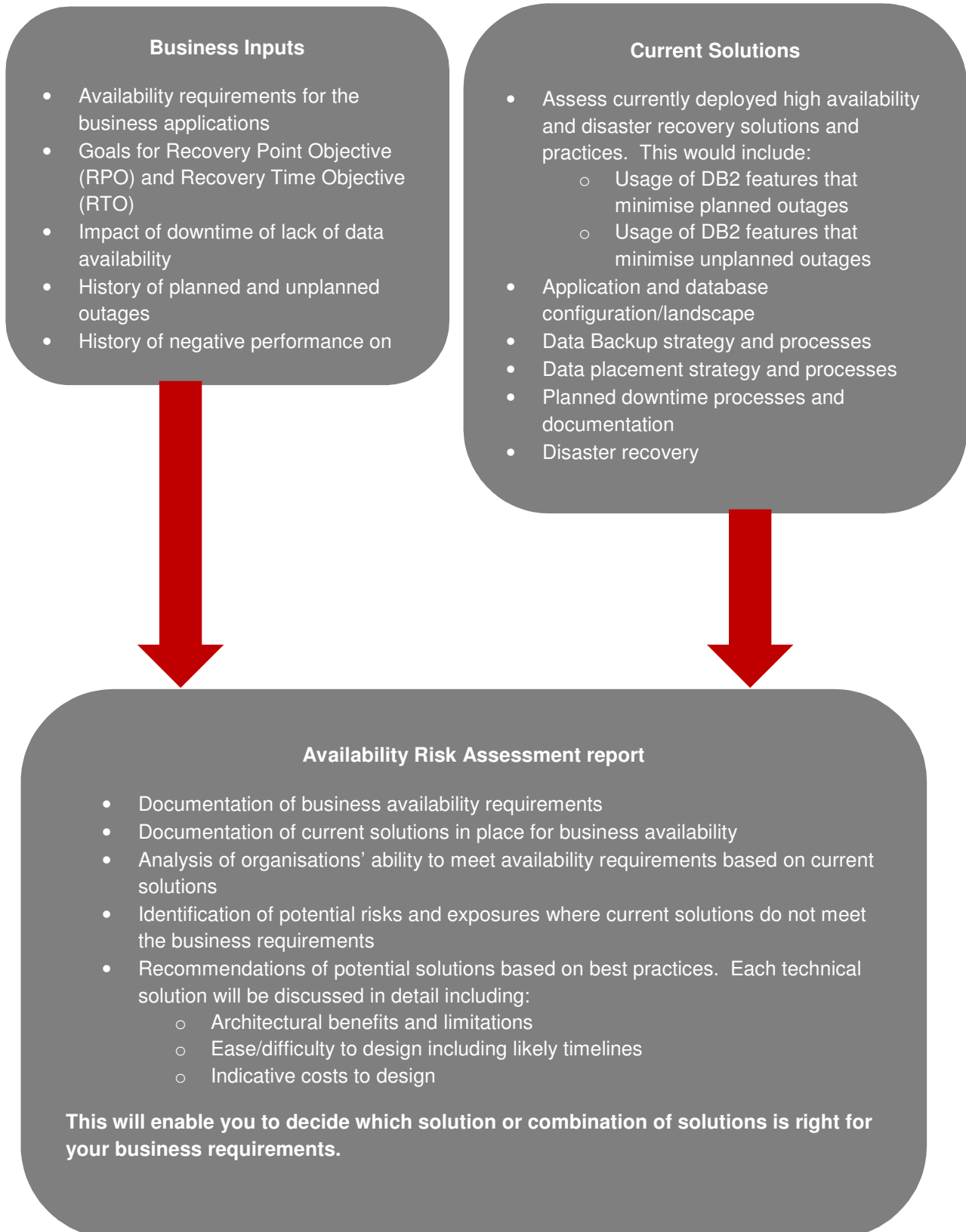
1. Where am I now? What exposures do I have to face?
2. From the range of options in the market which ones cost effectively provide the data availability I need?

Triton Consulting provide a simple three step approach to addressing DB2 Database Availability. This service is designed to enable CIOs and IT Directors to ensure that their organisations' IT infrastructure can meet growing availability demands and take away the worry of failure.



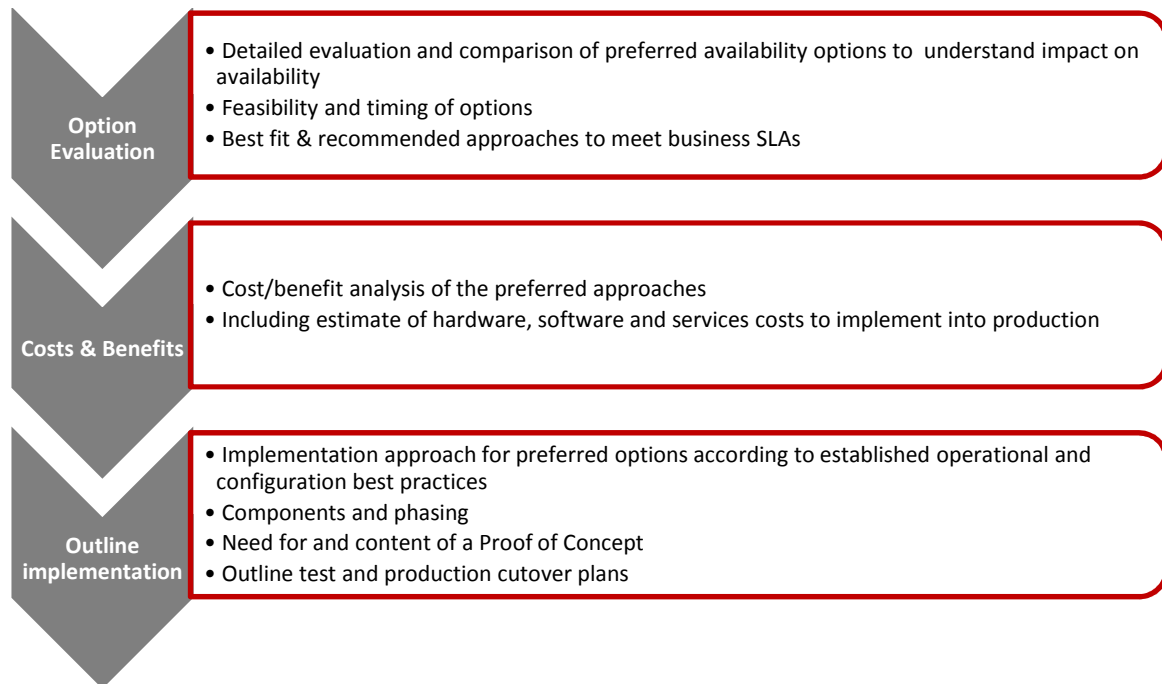
Phase 1 – Evaluation

Phase one includes an initial analysis of your current database availability processes and procedures. From this analysis, Triton will provide a detailed report. This will take into account your business SLAs for uptime, solutions for data corruption, back-up and recovery, a detailed impact analysis and will expose any areas of vulnerability and highlight risks in your existing system.



Phase 2 – Design

There are a range of different options and features available depending on your business requirements, budget and timescales. Based on the findings from our Phase 1 report and the solution recommended, the next stage is to design the availability solution in more detail. This will include detail on how the solution will fit in with your current environment, the associated costs and the implementation approach. After phase 2 you will have a detailed implementation plan for your availability solution with full cost details.

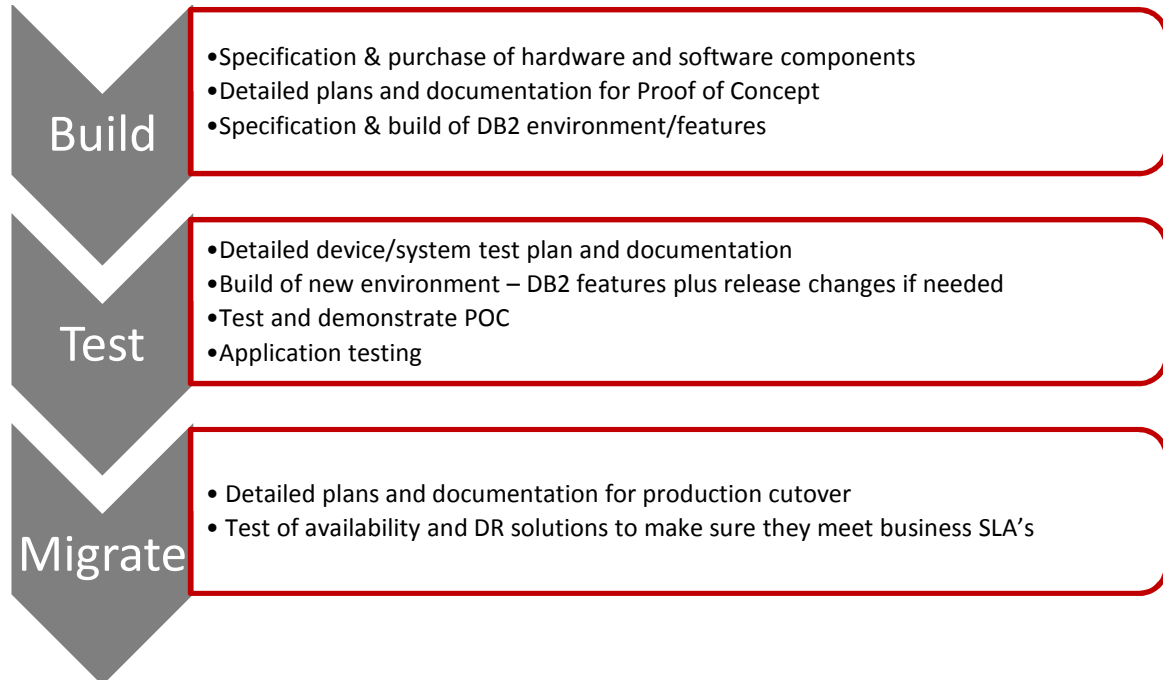


Technology Solutions Overview

DB2 features that minimise unplanned outages	
HADR	HADR is a database replication feature that provides a high availability solution for both partial and complete site failures. HADR protects against data loss by replicating data changes from a source database to a target standby database in real-time. With HADR, the standby database can take over in seconds in the event of a failure on the source database
Tivoli Systems Automation	Cluster managing software that facilitates automatic switching of users, applications, and data from one database system to another in a cluster. TSA is commonly used with HADR to automate the takeover of database operations from the primary HADR database server to the Standby database server in the event of a failure
Replication	SQL or Q-replication can be very useful for setting up a high availability failover database that can be also be used for test or reporting purposes
Automatic Client Reroute	Can be used with HADR to automatically redirect the clients to the standby database in the event of a failure on the source database thereby minimising application downtime
pureScale	DB2's clustering solution designed for organisations that require high and continuous availability, reliability and scalability for online transaction processing (OLTP) to meet stringent service level agreements.
pureScale + HADR	Can be used to implement disaster recovery of pureScale clusters over long distance. Together, DB2 pureScale and HADR reduce the risks of planned and unplanned outages to help meet your SLA requirements

Phase 3 – Implementation

This is where Triton can bring in their team of experts to implement your chosen solution and work with you to ensure that your database availability plan meets all of your business requirements. Phase three is a detailed piece of technical consultancy. From the design through to testing and implementation our team will work closely with your in-house staff to ensure detailed knowledge transfer and support along the way. Phase 3 will cover:



Customer examples

Resilient High Availability Solution for World Leading POS Provider

One of the world's leading providers of integrated software for POS was embarking on a large project with DB2 as the chosen database. The requirement was to provide a resilient high availability solution for the DB2 data. Triton Consulting was engaged to provide the DB2 expertise to achieve this goal. Following the analysis done in Phases 1 and 2 the following high availability solutions were implemented:

- Considering the size of the database was in terabytes, database backup and recovery was implemented using disk based snapshots (IBM N series snap backups) augmented using the DB2 Backup utility. This enabled backups to be taken very quickly with minimum impact to the system.
- Local failover was needed to provide a high availability solution so that in the event of a server failure the database instance will automatically switch to a nominated failover server. This was implemented using the TSA cluster software.
- Remote Failover was needed to provide a disaster recovery solution in the event of a total site failure. This was implemented using DB2 HADR. The production databases have corresponding standby databases which are kept in sync by HADR shipping log pages. In the event of the primary site experiencing a total failure, processing will be moved to the standby site. TSA was used with HADR to automate the takeover of database operations from the primary HADR database server to the Standby database server in the event of a failure.

Zero Tolerance for Down-Time at Fast-Growing Online Entertainment Technologies Brand

Triton Consulting has been working with a fast-growing company that develops online applications for major online entertainment brands across the globe with a special focus on sports, horse racing, poker and casino games. Their dedicated development team delivers a range of innovative solutions and strategies for websites and web-based games. The organisation has developed a DB2 application that enables their clients to place wagers. It is based on a DB2 LUW database sitting on a Linux platform on IBM P Series hardware.

Peak volumes were occurring at the same point each week and due to the success of the organisation, these were causing performance and availability challenges. Triton Consulting were engaged to address these challenges. Following the analysis done in Phase1, the following high availability solutions were recommended. These are now being implemented as part of a POC:

- The business SLAs state virtually zero tolerance for down-time. Availability was the primary objective and as such pureScale fitted the bill perfectly to provide an active-active clustering solution.
- HADR or Q-Replication are being considered to provide a Disaster Recovery solution for the primary DB2 pureScale cluster.

Conclusion

Outages are inevitable due to a range of causes including software problems, hardware failures and security breaches. It is therefore vital for organisations to make sure that their people and processes are ready when problems arise.

It is often the case that processes are not tested until a real outage occurs and this is when organisations discover that their procedures are not working as efficiently as they should be. This is a dangerous position to be in as it leaves vital services vulnerable to downtime. This can have a hugely detrimental effect on the business and those individuals who are ultimately responsible for keeping services up and running.

Sometimes it is necessary to get an independent, unbiased view of current processes and procedures to ensure that your systems are as stable, secure and efficient as possible. Triton Consulting is well positioned to provide this independent advice as we have many years of hard-won experience working with a range of customers. All of our consultants are true DB2 experts with deep technical knowledge and skills. This is combined with the ability to work with C-level teams to provide real, quantifiable business results from better managing IT.

About Triton Consulting

Triton Consulting specialises in Data Management and has been an IBM Premier Business Partner since 1998. Specialising in DB2 for both the Mainframe and distributed systems, Triton provides a full range of services from consultancy through to education and 24/7 DB2 support.

For more information visit www.triton.co.uk

Bibliography

Dunn & Bradstreet - <http://www.dnb.co.uk/>

US State Department news article - <http://www.informationweek.com/government/enterprise-architecture/passport-database-outage-we-regret-the-inconvenience/d/d-id/1297666>

Walgreen Pharmacy news article - <http://www.chicagotribune.com/business/breaking/chi-walgreens-pharmacy-database-crashes-temporarily-blocking-prescriptions-20140822-story.html>

Adobe news article - http://www.theregister.co.uk/2014/05/16/adobe_outage_database_maintenance/

O2 news article - <http://www.telegraph.co.uk/technology/mobile-phones/9615497/O2-to-scrap-network-database-after-repeated-failures.html>

RBS news article - <http://www.bbc.co.uk/news/business-30125728>