

Strategic Systems Solutions

Building Effective Support Teams – Database Management

Client Confidence through Intelligent Support

A Business Development Group White Paper





Introduction

At Strategic Systems Solutions (SSS), we provide 24x7x365 database support for a variety of applications at several large investment banks. Our experienced, highly-motivated professionals provide industry-leading service by utilizing our firm's Production Support best practices and processes. This methodology has been outlined in this white paper.

The focus of this document is database support. We can provide high calibre, experienced Database Administrators (DBAs), irrespective of technical platform, offering a full spectrum of expertise to ensure that your critical applications run as smoothly and effectively as possible.

In this document, we will explain what we believe to be the key principles and associated process flow of successful database support. We will describe the roles and responsibilities, objectives, and agreements that must be defined in advance of entering into a relationship with an external support provider such as SSS. Finally, we will explain our approach to creating 24x7 support teams to ensure the right level of coverage is provided, given the client's requirements.



Our Experience

Our DBAs have many years experience in working with critical database applications with our Investment Banking customers. Our teams provide global 24x7 support for a myriad of critical applications across our client base. Typically, our DBAs will have between 8 to 10 years of real practical experience working with industry standard Relational Database Management Systems such as Oracle, Sybase and SQL Server.

We can provide 'Application' and/or 'Infrastructure' DBAs – the main roles and responsibilities of which are described below.

Application DBAs

Application DBAs generally have knowledge of the particular business area in which the application is running. Their role is generally one of support and development but, specifically, they will be involved in:

- Application configuration – ensuring systems run effectively
- SQL statement tuning to ensure optimum efficiency and speed
- Core applications systems development

Infrastructure DBAs

Our infrastructure DBAs would take responsibility for the hub of your database architecture. They are capable of providing a complete service for the environment, from initial set up through to ongoing day-to-day management. Their key roles and responsibilities would include:

- Creating and maintaining databases
- Environment set up, standards creation and future strategy directives
- Backup and recovery
- Test environment creation
- Capacity planning – managing growth and disk space
- Day-to-day management and monitoring of the overall environment
- Release management / database changes and baseline versioning

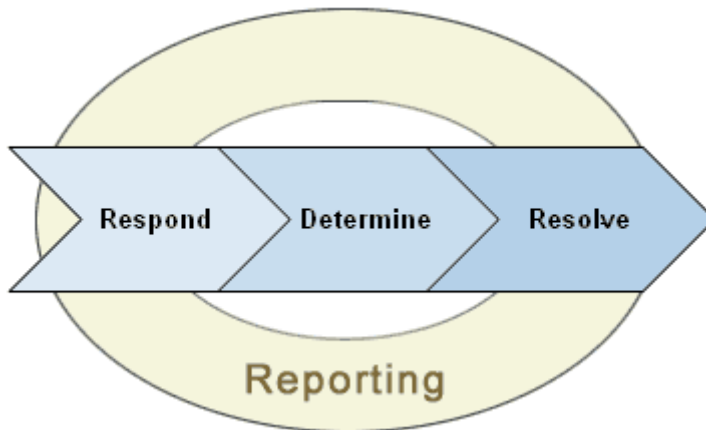
Note that it is often the case that the roles of the application and infrastructure DBA are combined. This would be especially true in smaller, less complex environments.

A full list of the roles and responsibilities of each can be found in Appendix A.



The Key Principles

The Strategic Systems Solutions' support model is based on several interdependent principles. The following diagram depicts this model.



Respond

When a client makes a request for support, communication is the critical issue. Strategic Systems Solutions DBAs immediately acknowledge each support request upon receipt. This action may sound simple, but it is one of the cornerstones of building client confidence.

After speaking with a DBA, the customer knows three things: that request is being addressed, who is addressing it, and an estimate of when it will be resolved. If an estimate cannot be quickly determined, then our DBA will keep the customer up-to-date on his request and return an estimate as soon as practical.

Customers judge your system based on the speed and accuracy of our support personnel's responses. Strategic Systems Solutions DBAs respond promptly and politely, giving the requester confidence in the rapid resolution of his or her issue.

Determine

Before resolving an issue, the DBA requires knowledge of the system and its immediate environment and access to the resources and tools for investigating problems and implementing fixes. Given these tools, our DBAs have the necessary skills to work effectively with the client as we gather information, determine the request priority, and record the information into the issue tracking system.

Occasionally, a DBA will encounter requests that they cannot resolve or do not have the authority to handle. Anticipating these cases, Strategic Systems Solutions drafts escalation procedures with our clients. In such situations, the DBA can confer with a more experienced colleague or manager. When a support request is escalated, the original DBA remains involved in order to expand his or her knowledge.

Resolve

Once our DBAs have successfully determined and recorded the problem, we provide the solution to the client in a timely manner, consistent with the estimate given in our initial response.



Reporting

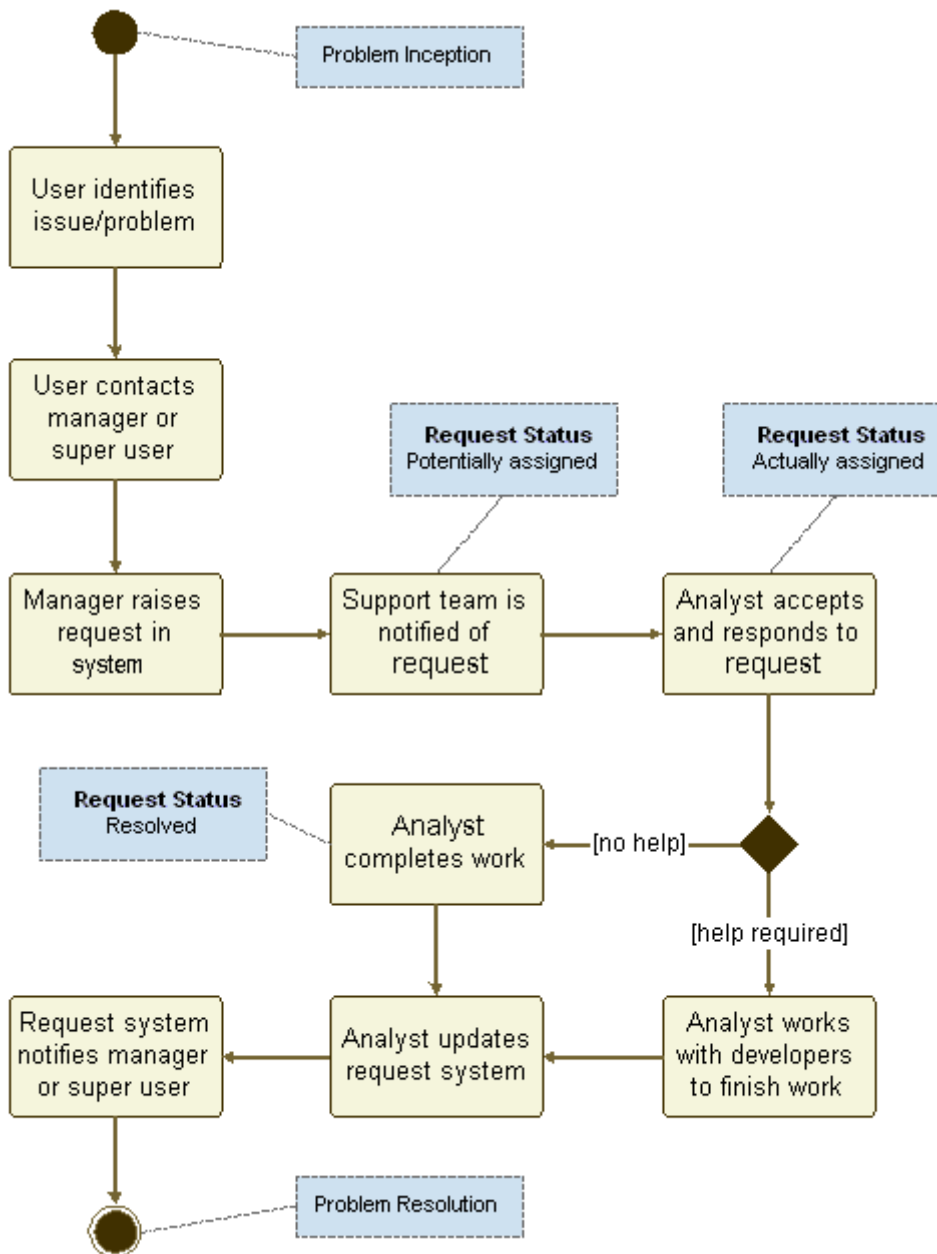
The reporting of problems and queries is an invaluable part of the support process. The recording of the problem is only the first step. We cannot overlook the need to fully detail the accompanying resolution, which will be invaluable when tackling future requests as well as providing key information for reports.

Fundamental reporting is designed and agreed upon as part of the Service Level Agreement (SLA). Not only does this process measure and report on actual support service levels achieved, in order to measure them against the client's expectations, it also helps to report on trends, totals, patterns, proposals, common problems and causes.



Managing the Support Process

The diagram below depicts how an issue or problem flows through a typical support request system. At almost any point in the workflow there will be alternate paths, exception processing and escalation issues to take into account. For clarity's sake, this diagram only illustrates the regular flow from problem inception through to resolution.





An integrated service

At Strategic Systems Solutions, our role as database support professionals should be transparent to the client's customers and internal user base. We become an integral part of the client's organization, working together as a team to meet the needs of the business.

To create and maintain this integration and transparency we align ourselves with the client such that:

- We provide DBAs with client telephone numbers
- We give DBAs client email addresses
- The team uses the client's tools
- We obtain access to the relevant client systems



Agreeing Your Services

Our overall aim is to provide DBA support services to an agreed level within an agreed budget. In advance of establishing any new support service, we spend time with our clients, defining exactly what their expectations are and discussing what we need to ensure a successful transition and long-term relationship.

Working together

The following table provides an overview of how responsibilities tend to be split between Strategic Systems Solutions and our client:

Roles and Responsibilities	SSS	Client
Define service level requirements		X
Document service level objectives and agreements	X	
Agree service level objectives and agreements	X	X
Provide prioritized risk areas to determine plan of action during an emergency		X
Measure, analyze and report performance relative to objectives and agreements	X	
Develop improvement plans	X	
Authorize and approve improvement plans		X
Implement improvement plans	X	
Report on service level results	X	X

In defining service level requirements, objectives and agreements, we will focus on specifying detailed information in the following areas:

- *Scope of work – how many databases will be supported, which ones will not*
- *Key roles and responsibilities of the team*
- *Which platforms are used?*
- *Database environment size – total terabyte size and growth estimates*
- *Required levels of coverage and response*
- *How the team will function day-to-day (work-flow system, shift patterns, escalation, administration, prioritization, etc.)*
- *Transition planning*
- *Management of the team*
- *Measuring and monitoring the team's objectives and targets*
- *Environment and security set-up*
- *Client contact details*
- *Billing*
- *Team structure and personnel specifications*



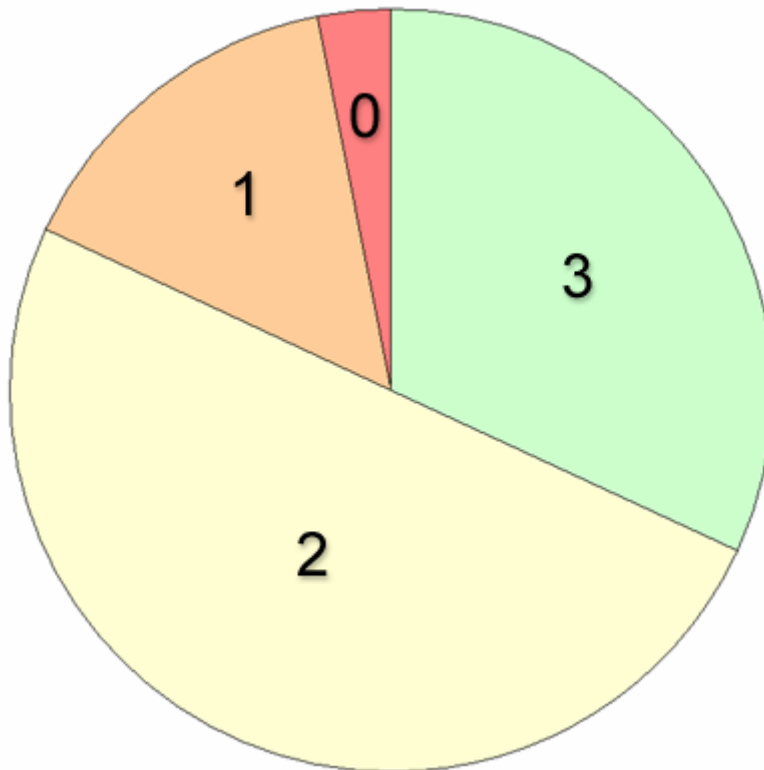
Planning Your Coverage

Strategic Systems Solutions offers a number of different coverage options for all time zones. Below are some general recommendations on how to approach support coverage. It includes a summary of common shift patterns utilized by our clients, with accompanying figures and scenarios to illustrate typical circumstances and associated risk.

The right coverage to mitigate risk

We recommend a minimum of two people available for each shift, to cope with such factors as lunch and comfort breaks, transport delays and health and safety requirements. This recommendation translates into a staffing level of three or more DBAs per shift, depending upon the client's attitude to risk. Holidays, sickness and training reduce the actual number of effective support staff by one for much of the time.

The following chart shows the total number of DBAs that can be available for support, based on a shift team of 3, factoring in holidays, sickness, training, etc.



What this chart means in real terms is:

- 50% of the time the shift team is down to 2 analysts (recommended minimum)
- 15% of the time, the team will rely on just one member of staff
- There is a small percentage risk of no-one being available (3%)
- Only one third of the time will there be a full complement of staff



Statistics used in above chart:

- Average working days per year: 260
- Average sick days per year: 10 (4%)
- Annual leave: 25
- Bank holidays: 8
- Training days: 5
- Days in lieu: 10 (for support outside of regular shifts)
- Lunch, comfort breaks, Health and Safety requirements: 2 hours per day

In order to realistically guarantee minimum support coverage the client will need three, or more, analysts per shift, depending upon the client's acceptance of risk.

Maintaining the basic principles

When numerous support issues arise, one of the DBAs must act as a Client Liaison and the other(s) as Problem Solvers. The Client Liaison keeps the users up-to-date and manages their expectations with regard to progress on the issue and expected resolution times. The Problem Solver(s) can then perform the work of analysing issues and finding solutions. From the above chart, it is clear that this type of support can be provided just over 80% of the time when there are three staff on a shift.

In our extensive experience, one person alone cannot cope with the demands of both the client liaison and problem solver roles. With only one person on a support team, that person ends up spending most of his or her time in status conversations with the client, while the actual support work remains neglected and continues to build. With two people working, this situation is reduced somewhat. Three or more people in support roles mitigate the problem by providing enough staff to work optimally in both types of support role.

Proactive and reactive, at the same time

During those times when we have the full compliment of three technicians available in the same shift group (just over 30% of the time, from the above chart), we ask one of the team to revert to a standard working day (8am – 5pm or 9am – 6pm). During this time we focus on proactive support activities, such as database monitoring, small fixes of production software, transition plans for new or modified software, preventative maintenance, status reporting and any other activities identified by the client, or the support team leader. This type of work is often neglected due to fire-fighting, yet the benefits to the support team and the client are often substantial.



Common shift patterns

24 x 5 Cover

Group structure:

Number of groups: 3

Staff per group: 3 (DBA expertise to be split according to client requirements)

Staff required: 10 (9 support shift staff, 1 support team leader)

Working hours:

Hours of cover: 24

Hours per shift: 8 (excluding lunch)

Description:

This shift pattern relies on 3 shifts of 8 hours, running from Monday to Friday.

24 x 7 Cover

Group structure:

Number of groups: 4

Staff per group: 4 (DBA expertise to be split according to client requirements)

Staff required: 18 (16 support shift staff, 2 support team leader)

Working hours:

Hours of cover: 24

Hours per shift: 8 (excluding lunch)

Description:

This shift pattern relies on 3 shifts of 8 hours to cover the 24-hour period.

24 x 7 Critical Cover

Group structure:

Number of groups: 4

Staff per group: 3 (DBA expertise to be split according to client requirements)

Staff required: 13 (12 support shift staff, 1 support team leader)

Working hours:

Hours of on-site cover: 7am (European Market open) until 10pm (US Market close)

Hours of off-site cover: 10pm until 7am (next day)

Hours per shift: Between 7 and 9 (excluding lunch)

Description:

This model employs 4 support groups of 3 staff per group, as well as designated individuals providing on-call support between US Market Close and next day European Market open. The groups also overlap to provide additional coverage at key times in the day.

The shifts are: 7am - 3pm (1 group), 9am - 5pm (2 groups), 3-10pm (1 group), with 1 person on-call Monday to Thursday and another on-call Friday to Sunday.



Covering the world

Global support across multiple time-zones can be difficult to visualize, which complicates subsequent planning and implementation of correct coverage. The following charts illustrate support coverage on a daily and weekly basis across 6 common time-zones, which will help plan and organize the right level of support for your organizational needs.

Daily Cover

The table below shows full working days (8am till 7pm) for 6 time-zones, from Sydney to New York, listed from the left. The 3 columns on the right of the table show a modified version of Strategic Systems Solutions’ 3-shift, 24-hour support pattern. The standard pattern has been modified slightly in this occasion so that shift handovers do not occur at the intersection of too many time-zone working days.

Sydney Australia	Tokyo Japan	Beijing China	Frankfurt CET	London GMT	New York EST	Shift 1 GMT	Shift 2 GMT	Shift 3 GMT
10:00	9:00	8:00	1:00	0:00	19:00			
11:00	10:00	9:00	2:00	1:00	20:00			
12:00	11:00	10:00	3:00	2:00	21:00			
13:00	12:00	11:00	4:00	3:00	22:00			
14:00	13:00	12:00	5:00	4:00	23:00			
15:00	14:00	13:00	6:00	5:00	0:00	5:45		
16:00	15:00	14:00	7:00	6:00	1:00			6:45
17:00	16:00	15:00	8:00	7:00	2:00			
18:00	17:00	16:00	9:00	8:00	3:00			
19:00	18:00	17:00	10:00	9:00	4:00			
20:00	19:00	18:00	11:00	10:00	5:00			
21:00	20:00	19:00	12:00	11:00	6:00			
22:00	21:00	20:00	13:00	12:00	7:00			
23:00	22:00	21:00	14:00	13:00	8:00		13:45	
0:00	23:00	22:00	15:00	14:00	9:00	14:45		
1:00	0:00	23:00	16:00	15:00	10:00			
2:00	1:00	0:00	17:00	16:00	11:00			
3:00	2:00	1:00	18:00	17:00	12:00			
4:00	3:00	2:00	19:00	18:00	13:00			
5:00	4:00	3:00	20:00	19:00	14:00			
6:00	5:00	4:00	21:00	20:00	15:00			
7:00	6:00	5:00	22:00	21:00	16:00			21:45
8:00	7:00	6:00	23:00	22:00	17:00		22:45	
9:00	8:00	7:00	0:00	23:00	18:00			

Note: the above times do not take into account daylight savings time offsets.



Weekly Cover

The second table below shows the coverage required to support the full working days of the 6 time-zones outlined above, relative to the UK (GMT). The labels indicate the start and end times for each area, and it is assumed for this example that there is no support requirement for weekends (i.e. 24x5 cover).

It is worth noting that the white areas making up Saturday and most of Sunday may need to be utilized for extra support/development work and weekend deployments. If this is the case, then this requirement must be factored into the shift plans (i.e. 24x6 or 24x7 cover).

GMT	Sun	Mon	Tue	Wed	Thu	Fri	Sat
0:00		CHN start					
1:00							
2:00							
3:00							
4:00							
5:00							
6:00							
7:00		EUR start					
8:00		UK start				AUS end	
9:00						JPN end	
10:00						CHN end	
11:00							
12:00							
13:00		US start					
14:00							
15:00							
16:00							
17:00						EUR end	
18:00						UK end	
19:00							
20:00							
21:00							
22:00	AUS start						
23:00	JPN start					US end	

Note: these times do not take into account daylight savings time offsets.

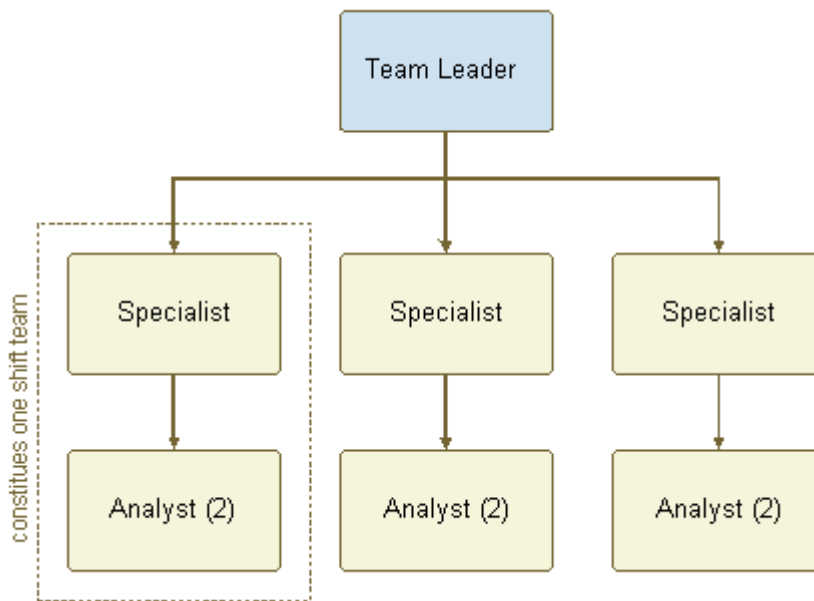


Building Your Teams

Once the client has fully defined the services they wish to support, as well as the levels of support they guarantee to their customers, then attention can focus on the structure and staffing of the support teams.

A solid team structure

The following details the classic support team structure. The illustration uses the 24x5 shift pattern as a basis, but the principles are the same for most models:



There are three groups covering the full shift pattern, with each group comprising a support specialist and two support analysts.

Choosing the right people

All roles will require individuals who are highly motivated, flexible and who possess the initiative to work on their own. Team members are expected to make a positive contribution to the work of the team within a short period of time and should enjoy the process of learning on the job. The ability to work in a team environment is essential, as is the ability to communicate effectively with staff and managers at a variety of levels within the client organization. Excellent verbal and written communication skills are essential, as much of the team's business is conducted using email and telephone communications. Business knowledge of some of the processes and technologies used within the client's functional environment would also be an advantage.

When our analysts perform daily support activities, they strive to improve their level of service, via problem analysis and service improvement programs. This approach delivers added benefits to our clients including automation opportunities, system enhancements, and tailored application monitoring software.



The DBA team leader will:

- Have 2-5 years experience in a team leader role, preferably within a support environment
- Have extensive experience in the relevant database technology – usually 8-10 years
- Have experience of communicating with members of senior management teams, as well as users
- Take direction from the client manager, and be capable of organising the day to day work of the team, as well as ensuring it is working towards meeting the client's strategic aims
- Have previous experience of monitoring workload, and producing management information based on workload
- Have experience of managing preventative maintenance activities
- Have strong communication skills, and be able to represent the interests of the team in meetings and via email communications

The support DBAs will:

- Have 5+ years experience of working as DBAs in a support environment
- Be able to work effectively to provide a quality support service, in high-pressure situations
- Be pro-active in approach, continually looking for ways to improve the service
- Be capable of learning new technologies and business applications on the job
- Be willing to work the shift pattern
- Be experienced in recognising urgent requests and prioritising or escalating accordingly

The support specialists will have the following additional skills / experience:

- Experience in training and mentoring less experienced support staff
- Make suggestions on how to improve the service, and communicate these appropriately to the support team leader

Specific technical skills will be identified when the detailed client requirements are established.

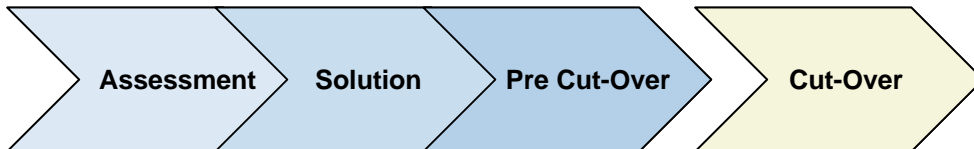


Making the Transition

Transition planning is an essential process that pulls all the above pieces together. The transition generally applies to the support and maintenance of existing applications or services rather than a new system.

A phased transition

From a high-level viewpoint, the transition can be split into 4 phases:



Phase 1 - Assessment

- *Identify, prioritize and start time-critical activities*
- *Draft service contract*
- *Conduct technical environment audit*
- *Assess current staff profile*
- *Assess current supplier profiles*
- *Conduct procedures audit*
- *Start knowledge transfer*
- *Produce audit report of current situation*
- *Identify and agree outstanding work*
- *Define and agree action list*

Phase 2 – Solution (design & build)

- *Perform risk assessment*
- *Draft interim and then final SLA*
- *Design technical environment*
- *Develop service organization*
- *Define supplier requirements*
- *Define procedures*
- *Set-up knowledge repository*
- *Plan for move*
- *Define and agree upon acceptance testing criteria*
- *Produce risk management report*
- *Establish and stabilize technical environment*
- *Prepare staff transfer*
- *Establish supplier relationships*
- *Establish procedures*
- *Implement service organization*
- *Transfer outstanding work*



Phase 3 – Pre Cut-Over (assess, finalize, transfer and deliver the work)

- *Finalize service contractual terms*
- *Prepare briefing/induction material*
- *Finalize and accept knowledge transfer*
- *Collate and review deliverables*
- *Finalize interim/final SLA*
- *Perform initial acceptance tests*
- *Finalize service plan and budget*

Phase 4 – Cut-Over (hand over the work)

- *Deliver staff briefing/induction*
- *Move and install*
- *Perform acceptance tests and sign-off*

Transition Responsibilities

1. *Estimating and planning*
2. *Contract/Finance*
3. *Technical*
4. *Staff/Organization*
5. *3rd party suppliers*
6. *Procedures/Documentation*
7. *Knowledge transfer*
8. *Staff/Infrastructure relocation*
9. *Acceptance/Sign-off*

Each of the above responsibilities requires an owner. Below are the job titles for these owners, although they are logical roles rather than physical, where one person can assume more than one job title.

1. *Transition manager*
2. *Finance manager*
3. *Technical manager*
4. *HR manager*
5. *Quality manager*
6. *Facilities manager*



Putting the plan together

The following table shows how the above pieces link together. It defines who is responsible for each set of tasks within each phase of the transition plan.

Task	Owner	Phase			
		1 Assessment	2 Solution	3 Pre Cut-Over	4 Cut-Over
Estimating and planning	Transition manager	X	X		
Contract/ Finance	Finance manager	X	X	X	
Technical	Technical manager	X	X		
Staff/ Organization	HR manager	X	X	X	X
3rd party suppliers	Transition manager	X	X		
Procedures/ documentation	Quality manager	X	X		
Knowledge transfer	Transition manager	X	X	X	
Staff/infrastructure relocation	Facilities manager		X		X
Acceptance/ sign-off	Transition manager	X	X	X	X



Appendices

Appendix A – Detailed Roles & Responsibilities

Data Engineering	Application DBA	Platform DBA (or Platform Infrastructure where specified)
<ul style="list-style-type: none"> ▪ Capture and validate data requirements in the context of the business flows and planned functional flows. ▪ Convert data requirements into logical and physical data models, which conform, to the reengineering standards. ▪ Assist with data flow mechanisms and design of ETL solutions. ▪ Determine and document volumetric estimates for data flows, database-related transactions, number of users, retention history for economic, reference data and transient data. ▪ Validate logical and physical data models using access path analysis. ▪ Identify and design any new database process to support the physical design, e.g. partitioning maintenance, purging/archiving. ▪ Build and maintain the physical database creation scripts. ▪ Participate in the Quality gate reviews for data-centric SDLC items. ▪ Develop and promote data standards for SDLC and use to facilitate effective data management. ▪ Establish and maintain a common meta-data repository component accessible by all team members. ▪ Document metadata for all new data requirement e.g. definition, format, source etc. in the MDR. ▪ Develop and promote database architecture principles. 	<ul style="list-style-type: none"> ▪ Develop and promote database development standards. ▪ Evaluate physical design for use of good practice and application of design standards. ▪ Deploy and manage changes to development environment. ▪ Assist in the creation of test data – requires understanding of technical design and functionality of the component. ▪ Assist component managers to resolve database performance issues relating to inefficient design, stored procedures or SQL. Component managers will own any performance issue relating to their component. ▪ Provide guidance on writing optimally-tuned SQL to application developers, consistent with physical data model design. ▪ Provide expertise on design issues, e.g. use of stored procedures, database triggers and constraints, etc. ▪ Develop housekeeping procedures for partition maintenance and statistics (this could be prod DBA responsibility). ▪ As necessary, assist component teams in performing database health checks after deployment in SIT, UAT and PROD. ▪ As necessary assist component teams to develop component-level capacity plans for current and future requirements. ▪ Participate in technical “Quality Gate” style reviews. ▪ Design and build solutions to implement security standards. 	<ul style="list-style-type: none"> ▪ Perform database software installation, upgrades, and configuration. ▪ Develop and implement platform architecture strategy for load balancing and scalability (Platform Infrastructure). ▪ Define and implement physical database layout (both on disk and within the database). ▪ Provide and maintain SIT, UAT and Production environments, including availability, monitoring, backup & recovery, space management, replication and audit control. ▪ Deploy database baselines into all ‘controlled’ environments, e.g. SIT, UAT and Production. ▪ Perform monitoring, instance tuning, and troubleshooting. ▪ Identify bottlenecks and design issues in SIT, UAT and Production. Route to database or component developers for analysis and research where applicable. ▪ Implement database security, roles, and profiles. ▪ Design and implement storage utilization and trend monitoring policies. Implement appropriate technical housekeeping solutions for storage management. ▪ Develop and implement database backup/recovery and DR strategy ▪ Assist developers with migration of data between environments. ▪ Design and implement strategies for database problem prevention, detection, and correction. ▪ Perform reorganizations. ▪ Create ‘container’ or ‘skeletal’ development database environment (table space, installing software)