|  |  |
| --- | --- |
| A large white ball  Description automatically generated  capstone project  STANDARD OPERATING PROCEDURES | Abstract  An introductory look at Business Principles and Practices  Elizabeth Waghalter  SOP |

**INTRODUCTION**

**Elizabeth Arlene Waghalter**

**ITSE 2356 Spring 2019**

The following document was assigned as a semester project for course ITSE 2356, Oracle Database Administration, Spring 2019. My name is Arlene Waghalter and I am the sole author of its contents. I used a personal project as my subject and tried to think in real world terms. It could use much more content, but I had to limit the scope for brevity’s sake.

The first section describes the required elements of the project with a timeline and a basic outline of the subjects covered. The main portion of the document covers all the required information in more depth. I provide charts and diagrams to further explain both the business itself and potential actions to take in case of performance problems or emergencies. Finally, the document is ended with the creation of the Junior Database Administrator role and job description. An index finishes the project.

I present this Capstone Project, Standard Operating Procedures, for your consideration. Thank you!

Sincerely,

Elizabeth Arlene Waghalter

d4b54e2f-305a-48b7-b791-caf660cbda5f

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**CAPSTONE PROJECT:**

*~Develop draft timeline to complete project:*

January 26 to May 16 (projected completion date) = 16 weeks

Jan 28 – Feb 9: #1

Feb 10 – Feb 19: #2

Feb 20 – Mar 3: #3

March 5 – March 15: #4

March 16 – April 3: #5

\*revised dates start here

April 27 – May 1: #6

May 1 – May 5: #7

May 6 – May 11 : #8

May 11 – May 16: finish, review, and turn in SOP

*~Record ideas during semester*

This has been a good exercise and has forced me to visualize areas of my proposed business I need to focus on. I plan to use this for a personal project in the works. A brief description would be a cloud-based database with a mobile interface (of thin clients/POS tablets for data input or a QR scan for personal download of application interface and data entry). The service encompasses hardware, software, networking, and data storage. Primary activities being the collection, storage and maintenance of multiple user-input data (typically < 1000 rows per project) consisting of character and number data, as well as photographic files and function-based columns.

Hardware:

POS tablets (2 sets)

Signage (may be non-tech)

Cloud servers/Oracle

Measurement scanner

Digital cameras (2-4)

Networking equipment: internet portal equipment

Software:

Oracle VPN connection to interface

Materialized view reports for multiple departments – data access by multiple departments (roles and security issues to be addressed by department)

Interfaces for multiple departments to populate outside data structures (compatibility issues addressed)

Networking:

Wireless network

Architecture issues/security

Routers, extenders

Remote servers

Storage:

Some information will be kept on a long-term basis, some information will be temporary

Some information will be kept secure, some information doesn’t need as much security

Remote servers repeated – size, speed

License restrictions

*~Prepare for evolution*

Eventually, this database will be receiving most information wirelessly via mobile technology.

Oracle SLAs allow for growth or cuts as necessary over time.

Eventually, a permanently-stored database of most of the information collected will be in place pending server needs.

It’s urgent to develop interface connections with other programs that require data input simultaneously – data type, structure size, correct data variables entered – accounting, production software, production services.

Continual training and researching latest products to improve network assets.

Building start-up team, maintenance plan, HR plan, growth team

Marketing plan focused on who, what, when, where and how often. Should include pricing information based on use: membership vs. individual queries, plus use fee.

Trade shows in relevant locations to meet the right connections and generate interest.

Business Plan with financial forecasts, ROI assessments, Business Case.

Business Case: Marketing directed presentation

Pricing plans

Billing/Invoicing

Creative directed presentation

Technical directed presentation

Architecture

Software

Security

Schemas, Tables, Rows, Columns

Roles

Human Resources directed presentation

Fundraising Plan including closers and development HR.

Improvements to architecture, software, interfaces, mobile connectivity, peripheral connectivity, accessibility.

Develop production Plan A, Plan B, Plan C as guarantee for data collection – imperative.

Develop Redundancy plan, Backup plan, Security, Data Sharing plan.

Develop Locations Plan that includes Tent set up, Greeting station, work closely with Locations.

Training for users: Production, Creative, Technical, End-Users

Beginning with Local work

Develop client base with plans to expand internationally beginning with Canada, Mexico, China, Brazil, and India. Beyond year 5, Europe, Australia, South Africa as well.

Develop Operations Plan encompassing Asset Acquisition, International Consulting, Financing

*~Establish new SOP Manual for Data Asset Division:*

**STANDARD OPERATING PROCEDURES**

**1. Corporate Database Backup Plan Policy**

We approach the DB Backup Plan with the same 5-Step Problem-Solving Method that should be used to make business decisions in all or nearly all cases:

A. Define the scope of the Policy

B. Investigate, collect relevant information

C. Analyze relevant information

D. Develop solutions to solve each category of Policy

E. Implement solutions

Current Policy

Hardware

Software

Schema

Architecture

Emergencies/Actions

Planning Future Policy

Development is part of everyone’s job description. Review current policy and take time to research and develop the system from the perspective of your department. Research options and discuss in team meetings.

-Analyze problem areas

Top 5 Timed Events from Statspack report

Actions to poor database performance:

1. Timed Event

2. Timed Event

3. Timed Event

4. Timed Event

5. Timed Event

Security Officers/Service Desk Personnel:

|  |  |  |
| --- | --- | --- |
| TITLE | NAME | CONTACT |
| CHIEF DATA SECURITY OFFICER | BRIAN KELLY | [Bryan.kelly@mobiletech.com](mailto:Bryan.kelly@mobiletech.com)  203-432-2221 |
| SECURITY DEPARTMENT HEADS: |  |  |
| MARKETING | RICH FLAHAVEN | [Rich.flahaven@mobiletech.com](mailto:Rich.flahaven@mobiletech.com)  203-432-2223 |
| CREATIVE | CHRIS HYMES | [Chris.hymes@mobiletech.com](mailto:Chris.hymes@mobiletech.com)  203-432-2222 |
| TECHNICAL | DEREK HARDY | [Derek.hardy@mobiletech.com](mailto:Derek.hardy@mobiletech.com)  203-432-2224 |
| HUMAN RESOURCES | JESSICA DELINE | [Jessica.deline@mobiletech.com](mailto:Jessica.deline@mobiletech.com)  203-432-2225 |
| SERVICE DESK: |  |  |
| 9 AM to 6 PM, MON to FRI | KEVIN PORTER | [Kevin.porter@mobiletech.com](mailto:Kevin.porter@mobiletech.com)  203-432-3336 |
|  | CHRISTINE COTE | [Christine.cote@mobiletech.com](mailto:Christine.cote@mobiletech.com)  203-432-3337 |
| 6 PM to 3 AM, MON to FRI | ASHLEY GOODNIGHT | [Ashley.goodnight@mobiletech.com](mailto:Ashley.goodnight@mobiletech.com)  203-432-3338 |
|  | GRAYSON LIVINGSTON | [Grayson.livingston@mobiletech.com](mailto:Grayson.livingston@mobiletech.com)  203-432-3339 |
| 3 AM to 12 PM, MON to FRI | DREW HUMPHRIES | [Drew.humphries@mobiletech.com](mailto:Drew.humphries@mobiletech.com)  203-432-3340 |
|  | VANESSA MAYO | [Vanessa.mayo@mobiletech.com](mailto:Vanessa.mayo@mobiletech.com)  203-432-3341 |
| 3 AM to 12 PM, SAT/SUN | BELINDA BASHARAT | [Belinda.basharat@mobiletech.com](mailto:Belinda.basharat@mobiletech.com)  203-432-3342 |
|  | WILLIAM TAYLOR | [William.taylor@mobiletech.com](mailto:William.taylor@mobiletech.com)  203-432-3343 |
| 12 PM to 9 PM, SAT/SUN | DEREK JONES | [Derek.jones@mobiletech.com](mailto:Derek.jones@mobiletech.com)  203-432-3344 |
|  | LANIYA BRADLEY | [Laniya.bradley@mobiletech.com](mailto:Laniya.bradley@mobiletech.com)  203-432-3345 |
| 9 PM to 5 AM, SAT/SUN (MON AM) | RAY COYLE | [Ray.coyle@mobiletech.com](mailto:Ray.coyle@mobiletech.com)  203-432-3346 |
|  | FRANCINE MATTHEWS | [Francine.matthews@mobiletech.com](mailto:Francine.matthews@mobiletech.com)  203-432-3347 |

Common Solutions:

|  |  |  |  |
| --- | --- | --- | --- |
| PROBLEM DOMAIN | ERROR CODE | COMMON CAUSE | COMMON SOLUTION |
| DB PERF ISSUE #1 | ‘ALERT LOG’ ERROR MSG | CAUSE #1 | RECONFIGURE PARAMS |
| DB PERF ISSUE #2 | ‘ENQ: TM – CONTENTION’ | CAUSE #2 | RECONFIGURE SCHEMA |
| DB PERF ISSUE #3 | ORACLE ERROR KNOWN | CAUSE #3 | CONTACT SENIOR DBA |
| DB PERF ISSUE #4 | ORACLE ERROR UNKNOWN | CAUSE #4 | CONTACT SENIOR DBA/ORACLE TECH SUPPORT |
| DB PERF ISSUE #5 | BOTTLENECK | CAUSE #5 | VIEW TOP 5 TIMED EVENTS FROM STATSPACK |

Current Roles, Privileges, and User Role Assignments:

|  |  |  |  |
| --- | --- | --- | --- |
| EMPLOYEE | ROLE | PRIVILEGES | REPORTS TO |
| RICH FLAHAVEN | SEC\_DPT\_HEAD\_MKTG | GRANT, ETC | BRIAN KELLY |
| CHRIS HYMES | SEC\_DPT\_HEAD\_CRTV | GRANT, ETC | BRIAN KELLY |
| DEREK HARDY | SEC\_DPT\_HEAD\_TECH | GRANT, ETC | BRIAN KELLY |
| JESSICA DELINE | SEC\_DPT\_HEAD\_HURE | GRANT, ETC | BRIAN KELLY |
| KEVIN PORTER | SVC\_DSK\_96MFA | SELECT, CREATE | DEREK HARDY |
| CHRISTINE COTE | SVC\_DSK\_96MFB | SELECT, CREATE | DEREK HARDY |
| ASHLEY GOODNIGHT | SVC\_DSK\_63MFC | SELECT, CREATE | DEREK HARDY |
| GRAYSON LIVINGSTON | SVC\_DSK\_63MFD | SELECT, CREATE | DEREK HARDY |
| DREW HUMPHRIES | SVC\_DSK\_312MFE | SELECT, CREATE | DEREK HARDY |
| VANESSA MAYO | SVC\_DSK\_312MFF | SELECT, CREATE | DEREK HARDY |
| BELINDA BASHARAT | SVC\_DSK\_312S/SA | SELECT, CREATE | DEREK HARDY |
| WILLIAM TAYLOR | SVC\_DSK\_312S/SB | SELECT, CREATE | DEREK HARDY |
| DEREK JONES | SVC\_DSK\_129S/SC | SELECT, CREATE | DEREK HARDY |
| LANIYA BRADLEY | SVC\_DSK\_129S/SD | SELECT, CREATE | DEREK HARDY |
| RAY COYLE | SVC\_DSK\_95S/SE | SELECT, CREATE | DEREK HARDY |
| FRANCINE MATTHEWS | SVC\_DSK\_95S/SF | SELECT, CREATE | DEREK HARDY |

\*For databases and instances, tablespaces, blocks, extents, segments, determine:

**Who** – who has access /Who has been granted which ROLES?

**What** – what they have access to/ ROLE definitions

**Where** – where they may have access/ INSTANCE, TABLESPACES, BLOCKS, TABLES, ROWS, COLUMNS AND Physical Location

REMOTE ACCESS VIA TABLETS, LAPTOPS, AND MOBILE DEVICES WITH AUTHORIZED VPN ACCESS VIA WEBSITE INTERFACES AND A DISTRIBUTED DATABASE ENVIRONMENT.

SERVER #1 SERVER #2 SERVER #3 SERVER #4

MOST SECURE 2ND MOST SECURE 2ND/3RD MOST SECURE LEAST SECURE

STORING THE FOLLOWING DATA (truncated for space):

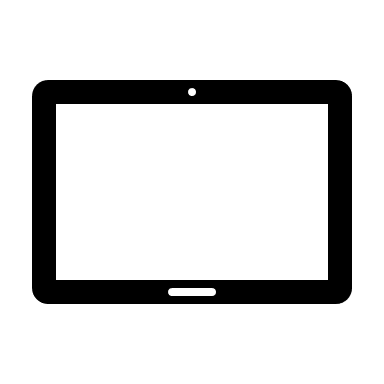
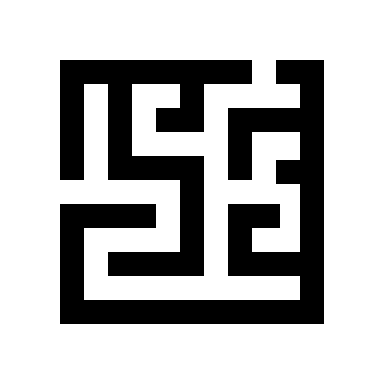
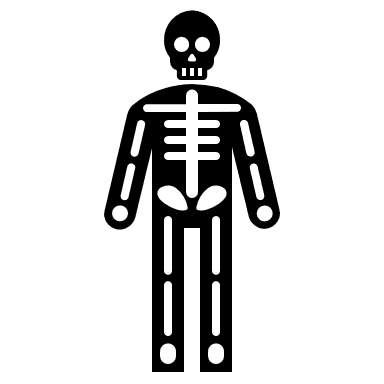
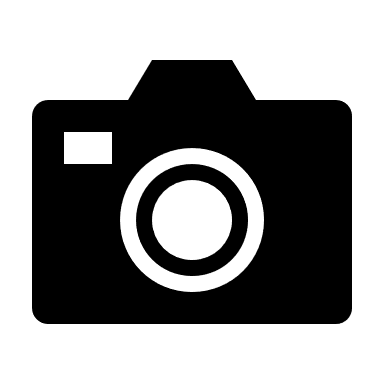
|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ROW |  |  |  |  |  |  |  |  |  |
| COLUMN | FIRST | LAST | MI | ADDRESS | MOBILE | EMAIL | SS# | SCANNED MEASUREMENTS | PIC 1 | PIC 2 |
| SERVER | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 2 | 4 | 4 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ROW |  |  |  |  |  |  |  |  |  |
| COLUMN | FIRST | LAST | MI | ADDRESS | MOBILE | EMAIL | SS# | SCANNED MEASUREMENTS | PIC 1 | PIC 2 |
| SERVER | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 2 | 4 | 4 |

INPUT VIA MULITPLE METHODS:

INTERFACE #1 **OR** INTERFACE #2 **AND** INTERFACE #3 **AND** INTERFACE #4

POS Tablet/Thin Client QR Scan to mobile Measurement Scanner Digital Camera

User A (per #) User QRA (per #) UNIQUE UNIQUE

User B (per #) User QRB (per #) UNIQUE UNIQUE

User X (per param) User QRX (per param) \_\_\_\_\_\_\_\_\_file .jpg, .pdf

**When** – when they may have access:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| End User | FIRST | LAST | MI | ADDR | MOBILE | EMAIL | SS# | SCAN | HMU PIC | WDROBE PIC |
| PRODUCTION STUDIOS | X | X | X | X | X | X | X | X | X | X |
| THEATRICAL VENUES | X | X | X | X | X | X | X | X | X | X |
| HUMAN RESOURCES/CLIENT | X | X | X | X | X | X | X |  |  |  |
| FESTIVAL ORGANIZERS | X | X | X | X | X | X | OPT |  | X | X |
| PRODUCERS | X | X | X |  | X | X |  |  | X | X |
| DIRECTORS | X | X | X |  | X | X |  |  | X | X |
| WARDROBE | X | X | X |  | X | X |  | X | X | X |
| HAIR/MAKEUP | X | X | X |  | X | X |  |  | X | X |
| PAYROLL | X | X | X | X | X | X | X |  |  |  |
| EXTRAS | X | X | X | X | X | X |  | X | X | X |
| CASTING | X | X | X | X | X | X | X | X | X | X |

Membership is based on monthly pricing; members enjoy a wide range of benefits: remote database access beyond project completion for a specified period of time from company website.

Billing/Invoicing includes monthly membership fee + usage fee for each user added per project. Minimums apply. Up-to-date billing and invoicing information are always available 24/7 from our secure website.

Database maintenance is limited to the Senior Database Administrator and the Database Administration Team

Other considerations: development costs, personnel costs, hardware compatibility, performance benchmarks

DATABASE MANAGEMENT PLANNING

\*Licensing – what type of Oracle license do we need now and in the future?

Licensing costs are based on the size of our End-User network/# of cores being used. Currently, we’re using the free version of the Oracle database management service while we develop our product and test. Eventually, we will have to move to a more expensive service level and that is expected to up our costs to at least $47,500. This is the cost of a single core access. Our initial architecture would have a single server collecting data from our 4 interfaces and small batches would be run after a majority of the data has been entered from the Users. Within 3 years, we would need to upgrade to 2 or 3 cores and within 5 years, 8 to 10 cores. Licensing fees and support fees need to be considered.

There are a number of optional add-on features that may be helpful in the future, however, we need to keep costs capped until we’re out of testing. We can determine our needs and costs once we have a product to show.

\*Architecture

Physical Database Design

~Indexes: each Extra is identified by a UNIQUE key index

~Partitions – range, list, hash, composite, indexes

~Partitions: the database is partitioned into 4 separate servers based on security level of the values stored there.

**Server #1 is the highest security and requires the most attention**. This server holds an Extra’s most sensitive information such as their physical address and Social Security #. It is not in our scope to keep this data long term. Address and Social Security information stored here is intended to be delivered to the relevant department/End-User and then archived and purged from our system within a year of film date. There are many reasons for this: first and foremost, we don’t need this information – others do – we include this as part an efficient workflow. Extras are paid when they turn in their costumes, so tax/payroll data is tied to wardrobe. Secondly, we do not want to be responsible for potential data leaks of this kind of sensitive information. And finally, we want to reduce our storage and other resource requirements. The costs for storing this data at high security is more than we want to spend.

**Server#2 is 2nd highest security and requires less attention than Server #1**. This server holds First Name, Last Name, Middle Initial, Mobile number, and email address. This is important contact information but not strictly confidential information. More End-Users will have access to this information, and this is basis of our membership structure – the reason why and End-User would want to be a member of this network. This data combined with the Scanned Measurements stored in Server #3 provide quick information when an Extra is needed for a re-shoot or a new project.

**Server #3 is 2nd/ 3rd highest security and requires less attention than Servers #1 and #2**. This server stores measurements – all number data. Although, the column is named “Scanned Measurements”, it’s meant as an umbrella term here and should be refined. Ultimately, this would be broken down into smaller, relevant measurements needed for fittings.

**Server #4 requires the least amount security as most End-Users will have access to this information.** This server stores photographic files only and most End-Users will have access to these images. Only Human Resources will not – they will have other formal identification that will be provided by the Extra.

For more about server configuration, see previous charts.

~Clusters: this architecture will be used based on the physical geography of projects. Access to data will be nationwide, however, regions will be established to make access to data faster.

~Materialized Views: these views will be created per ROLE privileges and will maintain the integrity of the data in the actual database.

~Denormalized Tables: Tables in our database will not need to be denormalized as the design is at sufficient granularity to meet the needs of the End-Users.

~External Tables: TBD

~Clustered Tables: TBD

(Sorted) Hash Clusters TBD

\*Sizing

~TBD.

\*Data types – when to use what:

~Character data types on Servers #1 and #2

~Number data type on Server #3 (has to be able to perform mathematical calculations)

~Photographic files on Server #4

\*Indexing – when to use:

Index all Primary and Foreign Key rows/columns

\*Constraints

~NULL – only the Scanned Measurements columns are allowed to be NULL.

~Unique column values – the SS# column and the HMU and Wardrobe Pic columns must be UNIQUE

~Primary Key values – Indexed values ensure unique row data

~Referential Integrity Values – For this exercise, there will be the following tables:

Name\_Contact, SS#, Scanned\_Measurements, HMU\_pic, Wardrobe\_pic, and Req\_Emp\_Docs. SS#, Scanned\_Measurements, HMU\_pic, Wardrobe\_pic, and Req\_Emp\_Docs will have foreign key references from the Name\_Contact table.

For a complete view of rows of data, use the following syntax:

SELECT \* FROM Name\_Contact, SS#, Scanned\_Measurements, HMU\_pic, Wardrobe\_pic, Req\_Emp\_Docs;

Add the WHERE clause to specify a more detailed query.

~Complexity Limits – important to consider all resource costs, exact relevant data

~Triggers – set triggers to send alerts at important milestones such as a membership that generates 25, 125, and 250 + new rows of data per project. This could be an indication for the need for growth of the system which will indicate a re- examination of the company’s financial plan.

\*Indexes

~Unique – Primary Key and Foreign Key, SS#, HMU\_pic, Wardrobe\_pic

~Non-unique – First Name, Last Name, MI, Address, Mobile, email, Scanned Measureme

~Reverse Key – currently, we do not need to use reverse key indexing

~Function-Based – we will definitely be using math calculations for some of our work, particularly with the Scanned Measurements. We can create reports/views with function-based columns; it’s debatable if they need to be indexed.

~Bitmap – Bitmap indexes would probably not be useful here because of the very wide array of data that could be generated within each column.

\*Views

~Regular – as much as possible, we want to limit access to the actual database data, so Materialized Views are what End-Users will be querying. Updates will be performed in batches.

~Materialized – to protect the integrity of the database, we will use Materialized Views for End-User queries, constrained by ROLE privileges

~Object – only the DBA ROLE needs access to individual objects in the database

\*Schema

|  |
| --- |
| NAME\_CONTACT |
| PK |
| FIRST NAME |
| LAST NAME |
| ADDRESS |
| MOBILE |
| EMAIL |

|  |
| --- |
| PICS |
| FK |
| HMU\_PIC |
| WARDROBE\_PIC |

|  |
| --- |
| SS# |
| FK |
| 1st 3 |
| 2nd 2 |
| 3rd 4 |

|  |
| --- |
| SCANNED MEASUREMENTS |
| FK |
| CHEST |
| WAIST |
| HIPS |
| GENDER |

\*Profiles

~TBD

\*Synonyms

~TBD, Materialized View columns

\*PL/SQL – when to use:

~Procedures/Functions: send alerts to notify DBA Team of unusual spikes or drops in database activity

~Packages: used for serialized, repeatable maintenance activities, and archiving

~Triggers – label, comments, results

\*External File Access

~TBD

\*Database Links and Remote Databases

~TBD, most End-User access will be remote

\*Physical Storage Structures

~Datafiles – character-based files, number-based files, scanned files, photo files

~Redo Log Files – some Redo log files are kept long-term, others for a shorter-term specified time, and still others for a short period of time based on security and cost concerns.

~Control Files - TBD

~Archived Log Files – some archived log files are purged while others are kept short- term. Very few are kept long term.

\*Installation

~Obtain software: visit our website to create an account, and research our membership guide for pricing options.

~Installation Guides: follow the step-by-step instruction on our website to install the necessary VPN software.

~Reference Manuals: TBD

\*Monitoring

~Generating Reports daily, weekly, monthly, and annually.

Using Statspack currently

~Know your database regular activity cycles

\*Troubleshooting

~Proactively monitor database activity, including alert logs.

~Proactively research poor performance problems

~Diagnose performance problem

~Develop solution

\*Storage/Backups of the backup – tape vs. disk; mirroring

~Some data will be archived on tape and stored within 100 miles of server locations.

~Some data will be kept on disk for querying purposes by End-Users defined by ROLE privileges.

IMPLEMENTATION

\*Installation

\*Monitoring

\*Troubleshooting

\*Storage/Backups

**2. Corporate Database Restore Policy**

Using the 5 step Problem-Solving Method introduced earlier in this SOP, we developed our policy:

DEFINE

A. Define the problem

Common problem areas:

i. Hardware

ii. Database Software

iii. Application Interface Software

iv. Networking

v. Database Tuning issues

INVESTIGATE

vi. SQL Tuning issues

B. Investigate

Known issues

Unknown issues

ANALYZE

C. Analyze the data

Run Statspack or AWR reports

D. Create a solution

DEVELOP SOLUTION

Develop

Test

IMPLEMENT SOLUTION

E. Implement the solution

Monitor changes and performance

Our backup system comprises a variety of methods for various data:

**Server #1** – Highest Security data is kept no longer than one year from project date. While active in our database, this sensitive information is mirrored on disk and kept secure with multiple authentication requirements. After a calendar year, the data in archived, the mirror deleted, and logs deleted. 30 days after archiving, the data is purged from the database.

**Server #2** – 2nd Priority Security data is less sensitive than data stored on Server #1. This data is kept for a longer period of time and will be queried much more often that data on Server #1.

The data is mirrored on disk, then after one year is archived, but not purged. After 7 years of no updates on a unique row, the data is purged with the assumption that target will not be returning and if individual does return, updated information will be required.

**Server #3** – 2nd/3rd Priority Security data is even less sensitive than data stored on Servers #1 and #2. This server stores only the Scanned\_Measurments table data. This data is kept for one year and can be queried. After one year, the data is archived and purged as measurements change frequently.

**Server #4** – 4th Lowest Priority Security data in the database. This server stores only HMU\_pic and Wardrobe\_pic photo files. These files are kept indefinitely and can be queried as part of a membership package. After 7 years, these files are archived on tape and stored within 100 miles of company headquarters. Any format photo file is accepted, except RAW files. RAW files are too big and unnecessary for our purposes.

Run complete backup of entire database on all servers from creation. Follow instructions by server above at one year mark and seven year mark – create PL/SQL procedures and triggers as reminders.

*Hot standby* – should include Server #1, a mirrored and synchronized copy of the original.

*Warm standby* – should include Servers #2, #3, and #4, batch-updated archives w standby equipment available.

*Cold standby* – hardware purchases/software installation guide located and is implemented only in a worst-case scenario should hot and warm standby plans fail.

Break down of downtime cost? TBD pending further research.

-Identify all breaches

-Secure physical database – hardware

-Secure networking – software and hardware

-Contact Oracle

-If necessary, shut down access to database in order to preserve integrity

-Study log and security files, and for good measure, check all OSI layers for damage or attack

-Review data; ROLLBACK any partial transactions; COMMIT at this point

-Ensure durability, integrity, of transaction processes

-Request review by Senior DBA

-Receive authorization from Senior DBA (see Security Team list earlier in this document)

-Restore service

-Recover any lost data

**3. SQL Query Performance Tuning Policy Benchmark**

**Process:**

A. Establish a baseline

B. Monitor database performance

C. Study query plan and log statistics

D. Use SQL Access Advisor and Query Optimizer hints to improve performance

E. Establish solution that will minimize the search path.

-Establish solution: minimize the search path to find the data

-Use online segment shrink to minimize fragmented free space below HWM

-Test solution

-Implement solution

-Return to normal operations

-Monitor performance

-Maintain event log/review

-Develop new policy

-Notify Users

-Add to SOP

-Checking parameters

-Views and Clusters

-Naming conventions

-Storage locations for each file type

-SQL Training

-mandatory/annual

-optional/on-demand

-SQL Workshops

**Defining Efficiency:**

A. Performance Standards: Speed

Accuracy

Storage

B. Recording Performance: Speed

Accuracy

Storage

C. Understanding and Eliminating Inefficient SQL statements:

Using Advanced Oracle features to improve efficiency

Recognizing atomicity, consistency, isolation, and durability in transaction management, and user management for data integrity

Querying the system: Using Statspack statistics

Querying the database

Balance effort, time, complexity, and risk

-define effort/seek ease

-define time/seek efficiency

-define complexity/seek simplicity

-define risk/seek security

-conclusions, established policies

Using Railroad diagrams

-on Insert

-on Update

-on Delete

-on Merge

Handling Duplicates

Understanding Redundancy in the system/actions

Nullable Data Items vs. Default Entries

D. PL/SQL Guidelines

~TBD

E. Best Storage Configuration for Efficient Queries

~TBD

F. SQL Developer

~TBD

G. Spooling Sessions

~TBD

**4. Database Maintenance Policy Process**

**Software:**

A. Performance – maintain high availability

update indexes

gather statistics (automate activity)

auditing

B. Backups – Best Practices (page 254, Fernandez)

i. SLA

ii. Document methodology

iii. Test

iv. Recovery

v. Contingency Plan

vi. Ensure Safety of Backups

vii.. Maintain multiples

viii. Error Checking and Logging

a. Log Files

b. Reports

ix. Change Control

x. Use Recovery Manager (RMAN)

xi. Prevent unlogged operations

xii. Backup all database including archived redo logs, control file, parameter file

xiii. Logical Backups

xiv. Oracle’s Flashback Feature

xv. ARCHIVELOG mode parameter settings

xvi. Check for Data Corruption

C. Archives – maintain performance by archiving unnecessary data (purging and rebuilding)

OR create partitions

**Hardware:**

A. Disk Capacity – proactively add extents to the database as it grows

B. System Capacity

Architecture – configuration best practices

On-going Maintenance Planning

User Management

C. Security Management

Data Guard

Password Maintenance

Patches

**Network:**

A. Building Entry

~TBD

B. Routers

~TBD

C. Servers

~TBD

**Emergency Response:**

A. Stakeholder Contact

i. Senior DBA

ii. DBA Team

iii. Senior Management

**5. Security Policy for password protection**

**Incident Management**

A. Who to notify

see chart in earlier sections

B. First actions

safety first

C. Examine Log Files

alerts, errors, audit trails

D. Examine Network connections

audit

E. Develop Solution

F. Implement Solution – using backups

G. Monitor results

H. Report results

**Problem Management**

A. User Management

i. Roles

\*certain roles provide access to certain objects

\*notify your DBA immediately if you notice something is wrong: either you cannot access what you should be able to access, or you can access objects you shouldn’t be able to access.

ii. Password change interval

\*passwords are changed every 3 months or upon login if more than 3 months.

\*Users will be prompted and cannot login until the password is changed

iii. Loose Lips Sink Ships

\*sharing your passwords can jeopardize the database, the company, and everyone’s security.

iv. Password Requirements

\*minimum of 12 characters

\*combination of upper/lower case letters, numbers, special symbols

\*cannot be your name, social security number, or birthday

\*cannot be a relative’s name, social security number, or birthday

\*User is solely responsible for keeping password secure

v. On-ramping new employees

\*new employees must fill out employment paperwork, participate in an orientation, and any other employment requirements before access to the database is permitted.

vi. Removing former employees

\*former employees or employees who have changed positions will have their User access removed (in the case of a job change, a new User account will be created)

B. Monitoring

i. Steps to prevent unauthorized access

ii. Recognizing unauthorized entry attempts

\*Set # of unsuccessful login attempts

\*Steps to take when unauthorized access takes place

\*Problem management

iii. Maintaining security over time

iv. Advanced training requirements

\*each DBA is required to take at least one advanced training course each year provided by the company.

\*the DBA may choose the training course, and HR must research and approve the course.

\*the company will pay all travel and expenses towards training for up to 3 days.

C. Researching Best Practices

~TBD

D. Maintaining confidentiality

i. Founding principles

a. Respect your peers and their data

b. Maintain personal safety, maintain data safety

ii. Privacy policy

**6. Annual Technology Review Plan (5-Year Risk Assessment)**

|  |  |  |
| --- | --- | --- |
| RISK ANALYSIS | PREVENTION | IN CASE OF |
| FIRE | Check fire extinguishers/ locations, annual fire drills, annual fire inspections | Leave immediately and call 911 |
| AIR | Annual tornado drills, review safety plan | Tornados/High speed winds – take shelter in lowest floor of bldg, most interior room.  Hurricanes – take shelter on highest floor that is safe to reach, most interior space but close to roof access in case of severe flooding. |
| EARTH | Annual earthquake drills, annual risk assessments | Earthquakes, sink holes, landslides – secure personal safety first |
| WATER | Plan for bad weather days, find alternate routes, shelter in place, annual assessments, repairs | Hurricanes, Catastrophic Storms, Floods, Plumbing |
| EXTERNAL ATTACKS | Monitor network, hardware, software, OSI module | Unauthorized entry, Phishing, Network Piracy |
| INTERNAL ATTACKS | Annual office behavior and hardware protection reviews, report suspicious activity to anonymous hotline | Employee accidents, acts of sabotage |
| ELECTRICAL PROBLEMS OTHER THAN FIRE | Annual Operations Practices review | Interruptions, Grid explosions |
| CLIMATE CONTROL | Annual HVAC inspection/system maintenance | Determine severity |

**Annual Safety Training Program**

Every Monday (after New Year’s Day) in January, we will organize enterprise-wide training and awareness of above risk factors. Attendance is mandatory. Wear comfortable clothing as we will be running some of the drills needed to weather the above risks.

**Annual Licensing Renew Fee**

During the year, each department is responsible for auditing hardware and software needs. The following process for reporting to management. Management will then review each department wish list to determine course of action for the future. Once our course is laid out, we can partner with Oracle to update our licensing needs.

**Staff Requirements**

It is imperative that all staff be aware of risks and safety while on the job. If you see something, say something. The DBA will collect surveys from departments on needs, concerns, issues regarding enterprise-wide technology. HR will collect surveys regarding enterprise-wide social concerns. Management will collect reports from both.

**Organization Chart**

|  |  |  |
| --- | --- | --- |
| Name | Title | Duties |
| Elizabeth Waghalter | SENIOR DBA | TBD |
| Best Candidate | DBA #1 | TBD |
| Best Candidate #2 | DBA #2 | TBD |
| Best Candidate #3 | Network Tech | TBD |
| Best Candidate #4 | Administrative Assistant | TBD |

**7. Create new user account for junior DBA position.**

CREATE ROLE jrDBA;

ASSIGN privileges to jrDBA role;

CREATE USERNAMEidentified by \_\_\_\_\_\_\_\_\_;

Assign role to user;

ALTER USERNAME (ALLOCATE SYSTEM QUOTA 0….)

**8. Standardized job description for the junior DBA position.**

ON-SET WARDROBE TECH is disrupting the way films are made. We make work flows more efficient on heavy shooting days that save production companies hundreds of thousands of dollars per production. We are seeking a junior DBA to build and advance our new concept. Position works from our offices in Studio City, CA and reports to the DBA team. Our technology is compatible with SyncOnSet and can provide content to that software automatically and seamlessly. Our product is also compatible with the Cast and Crew payroll database. Our goal is to be on every set in the US, Canada and eventually worldwide. Our concept will make film tax incentives obsolete. Skills required: minimum Associates degree in Computer Programming with foundation in Oracle/SQL or 3 years of experience working with Oracle. Must have film production experience or related experience. Must be US citizen or legal resident; we do not accept H1-B visa holders.

The junior DBA is responsible for supporting the development, testing and production of the OSWT database server. You will interface with internal company management as well as external partners (SyncOnSet and Cast and Crew) to drive and improve the product ecosystem. The Product is a service that includes hardware, software, and networking as well as data management and database development.

If you’re passionate about using technology to make processes more efficient, can communicate with diverse stakeholders and have a love of film, ON-SET WARDROBE TECH is looking for you. This is a great opportunity to develop your skills and be a part of something that will revolutionize film making.

Duties include:

\*manage and coordinate server environments

\*develop, deploy, and troubleshoot packages and other automated tasks

\*create and manage individual film project databases

\*manage user/role privileges

\*collaborate with DBA team to build scalable and testable solutions that are easy to maintain

\*consistently provide innovative recommendations to constantly improve the Product

\*deliver consistent improvements from iteration to iteration

\*assist in executing test cases and implementations

\*provide consistent and regular problem-solving solutions

\*monitoring all categories of database administration including availability, changes, security, growth, backups, workload, performance, and capacity

\*generate reports of all categories daily and send to Senior DBA

\*communicate with Senior DBA and other DBAs regarding activity

\*generate additional reports as requested by Senior and other DBAs

\*participate in development of long-term strategic goals

\*participate in developing database architectures, coding standards, and quality assurance policies and procedures

\*implement redundant systems, policies, and procedures for disaster recovery and data archiving as determined by the Senior DBA and the DBA team

\*Make recommendations of database products, services, protocols, and standards

\*create models for new database development and/or changes to existing databases

Qualifications:

\*Minimum Associates degree in Computer Science, IT, or related field OR 2-3 years of full time DBA experience

\*2-3 years of Oracle/SQL experience

\*At least one year of experience with PL/SQL

\*Strong understanding of database technology and applications

\*Ability to write efficient queries and procedures

\*Experience with an Agile/Scrum (or similar) environment

\*Demonstrate creative, strategic thinking

\*Experience working with teams

\*Excellent written and verbal communication skills particularly in relation to technology subjects and for diverse audiences

\*Familiarity with database hardware, software, and networking requirements

\*Familiarity with cloud-based environments, particularly Oracle

\*Understanding and experience in secure coding practices and data security

Preferred:

\*Understanding and appreciation of the film making process

\*Experience working with Creatives especially in relation to film

\*Understanding of API design and consumption

\*Deep understanding of Oracle

\*Deep understanding of SQL

\*Welcome constructive criticism and act cooperatively to implement changes

\*People skills

\*Understand migration issues and proactively address those issues with the DBA team

\*Familiarity with schema mapping techniques

\*Experience working with remote teams

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