

APN Partner Deal Acceleration Program –**Project Plan**

[*GUS Education India*] – [MothersonSumi INfotech & Designs Limited (MIND)] – [Date]

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|  | **Partner Credentials on AWS**  **Submitted By**  **MothersonSumi INfotech & Designs Limited (MIND)**  **MMM-DD-YYYY** |  |

**Revision History**

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Table of Contents

[1 Project Overview 4](#_Toc64441351)

[1.1 Executive summary 4](#_Toc64441352)

[1.2 Business Requirement 4](#_Toc64441354)

[1.3 Pain Points / Challenges in the current environment 5](#_Toc64441355)

[1.4 Project Success Criteria 5](#_Toc64441413)

[1.5 Pre-Requisites 6](#_Toc64441416)

[1.6 Dependencies 6](#_Toc64441417)

[1.7 Assumptions 6](#_Toc64441419)

[1.8 In-scope 7](#_Toc64441420)

[1.9 Out of Scope 7](#_Toc64441421)

[1.10 Risks and Mitigation 9](#_Toc64441422)

[1.11 Raci Matrix 10](#_Toc64441425)

[2 Solution Architecture Diagram 11](#_Toc64441476)

[2.1 Architecture on AWS 11](#_Toc64441477)

[2.2 Overview of the Architecture 12](#_Toc64441482)

[3 Project Execution / summary of milestones & deliverables 14](#_Toc64441483)

[3.1 Expected AWS Cost Breakdown by Services 14](#_Toc64441484)

[3.2 Acceptance 15](#_Toc64441485)

[4 Resources & Cost Estimates 16](#_Toc64441486)

[4.1 Project Sponsor(s) / Stakeholder(s) / Project Team 19](#_Toc64441487)

[Appendix A – technical project plan for migration project 20](#_Toc64441488)

[Appendix B – Pilot Migrations in Mobilize phase 22](#_Toc64441489)

**Disclaimer**

This deck outlines general guidance from AWS on what expectations we have to cover broader base of customer requirements. The intent is to make it easier for APN partners to work on funding requirements and reduce the cycle time. With sample text to refer, this is helpful for partners in building comprehensive SoW (Statement of Work). However, this deck shouldn’t be looked at as an ideal SoW. Sections identified below may not always apply and based on specific customer requirements, the contents of SoW will have to be updated/carved out by the partner team.

Please seek your own legal advice when writing SoW for customers

# Project Overview

GUS Education has a Job Portal, used by recruiters and potential candidates / professionals. Recruiters use the job portal to upload job notifications with descriptions.

Candidate use the job portal to create their profile with their latest skills.

The customer was facing a challenge in mapping the right job description to the candidate based on their skills.

The customer requirement was that a candidate visiting a prospective Job notification should be able to see the skills they satisfy, and their skill gaps with respect to the particular job notification.

This would help in mapping the right candidates to the right jobs, which enables savings in both candidate’s and recruiter efforts leading to a better user experience. This also reduces the cycle time to fulfill vacant position.

The mapping of the job description to the right set of technical skills was a difficult problem to solve and ML based solution was recommended for this.

## Executive summary

MothersonSumi INfotech & Designs Ltd. (MIND) is a part of Joint venture between **Samvardhana Motherson Group** (SMG) of India and **Sumitomo Wiring Systems** of Japan (SWS).

MIND is a provider of end-to-end software and engineering design solutions to companies around the globe. MIND started as an IT arm of the group in the year 2000 to support the IT needs of Samvardhana Motherson Group and Sumitomo Wiring Systems worldwide. MIND has further ventured into European and American Market to customers who are non-SWS and SMG to expand our services.

MIND's headquarters and development centers are in Noida (near New Delhi), India. MIND is a CMMi Level 5, an ISO 9001:2008 and ISO 27001 certified company. Since its inception in 2000, MIND has emerged as a strong world class IT Company with projects across the globe. MIND has multi-lingual software development capabilities including Japanese and German.

MIND is a Microsoft Gold Certified Partner, AWS, Azure & Google Cloud Service Provider, Oracle GOLD OPN partner and partner with other big IT brands.

MIND has Data Center (Level 3) services, Security Consulting Services Enterprise IT Helpdesk (Multi-lingual), Remote Application Management, Performance Management & Capacity Planning, Network Management Services and Application Hosting. MIND has defined Business Continuity (BC) and Disaster Recovery (DR) plans to mitigate risk of business disruption for its customers.

GUS Education India is a service wing of edu-tech giant Global University Systems based in Europe. It is a full-service digital marketing agency that delivers scalable online marketing services to Global University Systems’ associated brands. As a frontrunner in building digital eminence for a fleet of academic brands, GUS Education India is a rapidly growing organization that believes in achieving success through innovation.

GUS Indian wanted to build a NER Model for Extracting Technical Skills from Job Description using machine learning, for Skill Gap Analysis for their user and enhancing their user experience on Job Portal.

For this, a ML Mode is created for Mapping Technical Skills from Job Description from multiple data sources and get a best optimized model, many NLP/NER approached will be explored for the same e.g., Blazing Text etc. Data Collection and Preparation will form a significant chunk of work in this ML Project.

## Business Requirement

GUS India want that whenever any recruiter post new Job on the Job Portal, All the Technical skills will get automatically extracted from the Job Description, get displayed on the Job Portal, so that there will be no manual need to insert skills and use those skills for Skill Gap Analysis.

For this problem, Several Job Descriptions from different Job Portal sources to be used for this including India, Nigeria and US Job Portals and external third-party data providers.

## Pain Points in the current environment

Challenges faced by the *CUSTOMER* in the current environment include

* The customer was facing difficulty in mapping the job descriptions to relevant candidates based on the skill set.
* The customer was extracting skill manually which consumes lot of time.
* User experience was being hampered due to this and consequently more time required to map skills with candidate skills.

## 















## Project Success Criteria

Application performance under test environment will define the success

* Implementing the proposed solution in development environment
* Reflecting the extracted technical skills on the job portal user interface.
* Needed F1 Score of model greater than 75%.
* Reduction in cycle time to fill-up a vacancy.
* Significant reduction in human effort and cost.

## Pre-Requisites

* Architecture diagram, documentation, inventory and performance details of the existing environment will be made available
* AWS Administrator/necessary access to AWS Partner to start and work on the project
* Customer to provide support on understanding the Stored Procedures and business logic
* Assign a Data Scientist to work collaboratively with joint accountability of the program
* Paid Proxies for data Scrapping.
* EMSI Skill Extraction API Premium Subscription.

## Dependencies

* Network bandwidth requirement for end user connectivity to AWS
* SageMaker on-Demand Notebook
* GPU Based Instance for Model Training and Deployment

## Assumptions

* Billing of AWS services will be handled by GUS India.
* Data to be extracted from India, Nigeria, US included multiple Job Portals.
* Joint effort is required between MIND & GUS India business mapping
* Data from external sources, will be copied directly into S3 enabling some quality checks, but API integration with these external sources if required is NOT considered in current scope.
* Quality Checks are limited to the basic checks
* Anything which is not covered as a part of this scope can be taken as a part of data engineer/ ML engineer / data scientist efforts.

## In-scope

*Scope-1 – Data Analysis & Integration - Data Scrapping and Labelling*

Data accumulation from various sources including web scraping from certain sources and do analysis of its usefulness in modelling.

a. Scrapping Job Description from following Data Sources on weekly basis.

1. Indian Job Portal

2. Nigeria Job Portal

3. US Job Portal

4. Third Party Job Description Provider

b. Setting up pipeline for data ingestion from Job Portals to AWS S3.

c. Creating a Job for preprocessing of the Job Description including:

1. Removing special characters

2. Tokenize each word

3. Remove HTML tags

4. Make everything to lowercase

d. JD Scraped data from Job portal is fed into EMSI API Skill extractor to be labelled data (technical skills) extractor

*Scope-2 – ML Modelling*

Create a NER Model using a suitable modelling technique, using all Pre-Processed Labelled Job Description.

a. We get Labelled data with start char and End char position information of tagged data.

b. We remove data points where NER tagging is empty.

c. We convert NER tagging to BIO/IOB format (short for inside, outside, beginning) is a common tagging format for tagging tokens.

d. We divided the data into 90% training and 10% testing data.

e. Create a label list consisting of all the tagged skills.

f. Extracting features from existing pre-trained BERT base cased model.

g. We have trained the model using BERT for 25 epochs Validated the Model on test data. Fine-tune parameters accordingly and re-run the model.

h. We have saved all the checkpoints for above models, we can re-train the model from stored checkpoint (All check points are stored in AWS S3).

*Scope-3 (Monthly) – Monitoring & Governance*

a. Monitoring of data ingestion pipeline, data transformation jobs, metadata creation jobs and S3 resources

b. Governance for managing IAM users, managing access to AWS services/resources

c. Data Access Policies for data lake

d. Usage monitoring of the resource for cost optimization.

e. Billing alerts/notification.

Note –

1. Anything which is not covered as a part of this scope can be taken as a part of data engineer / ML Engineer / Data Scientist efforts.

*Scope-4 (Need Based) – Data Engineering Activity – New Data Source Setup*

a. Building pipeline for ingesting data from new data source.

b. Creating jobs for data transformation and metadata creation.

c. Transforming the data to flat files, encrypting the data and sharing the data with consumers.

d. Monitoring & notification setup for data ingestion pipeline, data transformation jobs and Data Lake resources for the new data source.

\*\*Typical Data engineering role activities are

* Create data repositories

• Identify and implement a data-ingestion solution

• Identify and implement a data-transformation solution

• AWS Services/tools - EMR, Glue, Athena, S3, DMS, Kinesis etc.

*Scope-5 (Need Based) – Data Scientist Activity –*

1. Any tasks as per data scientists’ role / activities

\*\*Typical Data Scientist role activities are

* Sanitize and prepare data for modelling

• Perform feature engineering

• Analyze and visualize data for machine learning

• Machine Learning Modelling

• Implementation and Operations:

* Assessment of workloads and mapping them to AWS services
* Configure/setup AWS services
* Design and Implement the server architecture
* Security Configurations
* Migration of database
* Migration of the application
* Go Live

## Out of Scope

1. Issues related to application configuration, setup, and stability along with application testing
2. Any third-party components deployment or third-party software solution configuration
3. Performance testing on production volume data
4. Procurement of any software, tools or pertinent licenses unless specifically mentioned in this SOW
5. Any upgrades required to other systems to enable them to work with the new setup
6. Non-functional requirements like application load testing, benchmarking is responsibility of the customer
7. Issues arising out of DoS attacks (Denial of Service), security related issues. However, these will be attended by partner on a best effort basis and charged on actual efforts
8. Any unplanned changes to the AWS design, new technology stack support, deployment or infrastructure will be out of scope. If and when so desired, these must go under a Change Management process
9. Any licenses / tools cost not specified in this proposal will be customer ’s responsibility
10. Any security / legal / compliance audits

## Risks and Mitigation

|  |  |
| --- | --- |
| **Risk** | **Mitigation** |
| **EC2 instance sizing is not appropriate** | Currently, no performance stats available. Like-to-like sizing from on-premises environment  While executing the PoC, partner & customer will collect statistics in the existing, and AWS environment  After 3 months of running in production, sizing of EC2 instances will be re-assessed to optimize for cost and performance |
| **Single AZ setup** | Educate and sensitize the customer highlighting the potential of business impact; customer owns the risk |
| **Change of architecture** | While moving from PoC to production there can be change of the architecture which may lead to change in cost |
| **Stringent timelines, any delay will have a cascading effect** | Requested artefacts should be provided within 2 business days. Also, a dedicated PM from customer would be required for governance activities |
| **Performance bottlenecks impacting overall SLA** | Performance testing to be done by *customer* during the implementation phase with production-like data in a separate environment.  Observations to be shared with development team for required course corrections. |
| **Lack of support from business, existing partner** | Manage project timelines through regular governance agreed mutually by partner and customer at the time of project initiation. Escalate in timely fashion in case of any issues/risks |
| **Lack of testing assets and tools to validate the implementations** | customer to provide the input & output for comparison testing from their existing application |

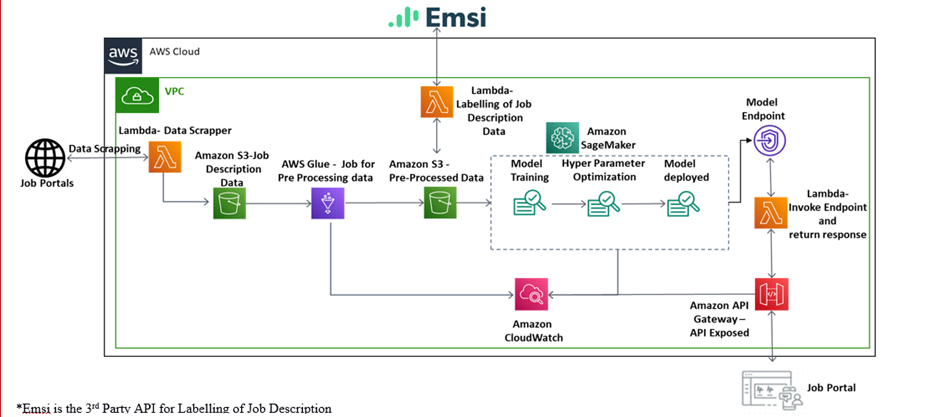
## Raci Matrix

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tasks/Activities** | **Responsible** | **Accountable** | **Consulted** | **Informed** |
| Project initiation & Kick-off | MIND | GUS EDUCATION INDIA | AWS | GUS EDUCATION INDIA |
| Infra setup and configuration - Foundation | MIND | GUS EDUCATION INDIA | AWS | GUS EDUCATION INDIA |
| Discovery | MIND | MIND | AWS/ GUS EDUCATION INDIA | AWS/ GUS EDUCATION INDIA |
| Design | MIND | MIND | AWS/ GUS EDUCATION INDIA | AWS/ GUS EDUCATION INDIA |
| Implementation | MIND | MIND | AWS/ GUS EDUCATION INDIA | AWS/ GUS EDUCATION INDIA |
| Code Build | MIND | MIND | AWS/ GUS EDUCATION INDIA | AWS/ GUS EDUCATION INDIA |
| Code Review | GUS EDUCATION INDIA | GUS EDUCATION INDIA | AWS | AWS |
| Validation | MIND | GUS EDUCATION INDIA | MIND | AWS |
| Sign-off | GUS EDUCATION INDIA | GUS EDUCATION INDIA | AWS/ MIND | AWS/ MIND |



# Solution Architecture Diagram

## Architecture on AWS

**

## Overview of the Architecture

MIND discussed the problem with the customer and after analyzing the available data, it was determined that an NLP based ML solution would fit the business problem. Solution flow proposed consisted of the following steps

• Pre-processing of job descriptions data - i.e. removing special characters, tokenize each word, remove HTML tags, case conversion.

• Labelling of Job descriptions data to skills using EMSI API - This provided the labelled data for job descriptions for initial training until the model was created. We get Labelled data with start char and End char position information of tagged data.

• Pre-Processing for model training

O Removing data points where NER tagging is empty.

O Converting NER tagging to BIO/IOB format (short for inside, outside, beginning) is a common tagging format for tagging tokens.

O Extracting features from existing pre-trained BERT base cased model.

O Dividing the data into 90% training and 10% testing data.

• Model Building: ML model was trained (NER) using Blazing Text and BERT.

O With the available data, the model is trained on BERT for 25 epochs along with validation of the model.

O Hyper parameters were tuned iteratively to optimize the model.

• Model Deployment: Deployed the ML model using Flask API, the API takes job description as an input and outputs Technical Skills.

The overall model development and deployment was done on Amazon Sagemaker. Cloudwatch was used for monitoring the training jobs and resulting metrics. The end point deployed on Sagemaker was called through API Gateway and Lambda function to return a set of labels for given Job description. This API was integrated into the customer Job Portal.

# Project Execution / summary of milestones & deliverables

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Scope-1 Schedule** | | | | | | |
| **Activity** | **Wk1** | **Wk2** | **Wk3** | **Wk4** | **Wk5** | **Wk6** |
| Scrapping Data from Indian Job Portal. |  |  |  |  |  |  |
| Scrapping Data from Nigeria Job Portal. |  |  |  |  |  |  |
| Scrapping Data from US Job Portal. |  |  |  |  |  |  |
| Creating Pipeline for Data Pre - Processing |  |  |  |  |  |  |
| Labelling of Job Description through EMSI API |  |  |  |  |  |  |
| Monitoring & notification setup for data ingestion pipeline, data transformation jobs and Data Lake resources |  |  |  |  |  |  |

Wk- Week

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scope-2 Schedule** | | | | | | | | | |
| **Activity** | **Wk7** | **Wk8** | **Wk9** | **Wk10** | **Wk11** | **Wk12** | **Wk13** | **Wk14** | **Wk15** |
| Primary Data Exploration. |  |  |  |  |  |  |  |  |  |
| Clearing Issues, observations, Queries, Pending items |  |  |  |  |  |  |  |  |  |
| Data Exploration - remove data points where NER tagging is empty |  |  |  |  |  |  |  |  |  |
| ML Modelling –Multiple Iterations – Train, Test, Accuracy |  |  |  |  |  |  |  |  |  |
| Optimizing the Model through HPO |  |  |  |  |  |  |  |  |  |
| Model Deployment- Creating Multiple Environments |  |  |  |  |  |  |  |  |  |
| Monitoring the Model and API metrics |  |  |  |  |  |  |  |  |  |

Wk- Week

**For Scope-3: (applicable after end of scope-2)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Monitoring & Governance** | **M1** | **M2** | **M3** | **M4** | **M5** | **M6** |
| **Monitoring & Governance Activities** |  |  |  |  |  |  |

M - Month

## Expected AWS Cost Breakdown by Services

The monthly estimate for this project can be reviewed by following the below link:

[https://calculator.aws/#/estimate?id=6b0afe5a86ac2ac9876b2d98a56de911abb43a1f](https://calculator.aws/" \l "/estimate?id=6b0afe5a86ac2ac9876b2d98a56de911abb43a1f" \o "https://calculator.aws/#/estimate?id=6b0afe5a86ac2ac9876b2d98a56de911abb43a1f" \t "_blank)

## Acceptance

*[To conclude a project, define acceptance process here. For example:*

*Upon completion of a Phase, PROVIDER will submit the associated tangible Deliverables, to CUSTOMER accompanied by an Acceptance Form in the form set forth in Appendix B to this SOW. Upon such submission, CUSTOMER will review, evaluate and/or test, as the case may be, the applicable Deliverable(s) within eight (8) business days (the “Acceptance Period”) to determine whether or not each Deliverable(s) satisfies the acceptance criteria for the particular Deliverable in all material respects. If the Deliverable satisfies its acceptance criteria in all material respects, CUSTOMER will furnish a written acceptance confirmation to PROVIDER via the Acceptance Form prior to the end of the Acceptance Period. For a Deliverable that is not accepted due to a non-conformity or defect, CUSTOMER will indicate the detailed reasons for such rejection on the Acceptance Form and return the Acceptance Form together with the associated tangible rejected Deliverables, if any, to PROVIDER (a “Rejection Notice”) within the Acceptance Period. Upon receipt of a Rejection Notice, PROVIDER will promptly correct any defects or non-conformities to the extent required so that each Deliverable satisfies the requirements of this SOW and its acceptance criteria in all material respects. Thereafter, PROVIDER will resubmit a modified Deliverable to CUSTOMER , accompanied by the Acceptance Form and the process set forth above will be repeated. However, CUSTOMER will limit its review, evaluation and/or test of each resubmitted Deliverable to determining whether or not PROVIDER has corrected the defects or non-conformities identified in the Rejection Notice and to the effects or impact which PROVIDER’s corrections or modifications have on other Deliverables or other portions of the same Deliverable. If CUSTOMER fails to provide PROVIDER with the above described Rejection Notice prior to the end of the applicable Acceptance Period, then the corresponding Deliverable(s) are deemed accepted.]*

Typical deliverables at the end of the engagement are Standard Operating Procedures, Build document. However, what the customer desires for acceptance needs to be discussed and agreed upon before beginning of the engagement

# Resources & Cost Estimates

*[List all billable and non-billable resources involved in the project]*

*APN partner are required to ensure Project Plan and the Work Break Down list is comprehensively charted out. Each task should be broken down in to as much details as possible and efforts listed down should be justifiable*

Partner Technical Team

1. Title - Name
2. Title - Name

|  |  |
| --- | --- |
| Resource | Rate (USD) / Hour |
| Solution Architects |  |
| Engineers |  |
| Other (Please specify) |  |

|  |  |  |
| --- | --- | --- |
| Project Plan and Work Break Down List | | |
| Infrastructure Creation and Implementation | | |
| Common Infrastructure & Activities | | |
| Roles | **Sub task** | **Effort required (person days)** |
| Technical Architect | Discuss the Application and Infrastructure Architecture. Understand Dependencies and Integration points |  |
| Create Document, Reviews from Customer, Corrections and Document sign off |
| Sr. Cloud Engineer | AWS Account Creation / Setup or Gain access if existing A/c and IAM (Roles, Policies, Groups and Users) Access Setup |  |
| Setup of Cloud Trail & Billing with their S3 Buckets |
| Setup Network components like VPC, OpenVPN, Subnets, Routing Tables, NAT, Bastion/RDP GW etc. as per the architecture |
| Setup of NACL's & Security Groups and configuration of security rules as per the document. |
| Setup of S3 Buckets |
| Setup of Base AMI's (App / Layer wise) with latest OS patches & software's required by the applications. |  |
|  | **Total** |  |
| Kubernetes Architecture | | |
| Roles | **Sub task** | **Effort required (person days)** |
| Sr. Cloud Engineer | Setup and configuration of the Kubernetes cluster |  |
| Sr. Cloud Engineer | Setup and configuration of the Worker Nodes |  |
| Sr. Cloud Engineer | Configuration of AutoScaler on Kubernetes cluster |  |
| Sr. Cloud Engineer | Setup and configuration of Load Balancer Ingress Controller |  |
| Sr. Cloud Engineer | Setup of Cluster Level monitoring using Open Source tools |  |
| Sr. Cloud Engineer | Setup of ElasticCache service |  |
| Sr. Cloud Engineer | Setup Client Build Environment with Fileshare |  |
| Sr. Cloud Engineer | Setup HashiCorp Vault and configure KMS |  |
| Sr. Cloud Engineer | Setup ALB and WAF then configure it to route requests to servers |  |
| Sr. Cloud Engineer | Setup RDS with MySQL |  |

|  |  |  |
| --- | --- | --- |
| Sr. Cloud Engineer | Support to customer on application setup.  (Deployment server in case of Web/App/Api) |  |
|  | **Total** |  |
|  | **Data Migration (for all 7 customers)** |  |
| Roles | **Sub task** | **Effort required (person days)** |
| Sr. Cloud Engineer | Migrate Data from Cloud SQL to RDS |  |
| Sr. Cloud Engineer | Migrate Data from Cloud storage to S3 |  |
|  | **Total** |  |
|  | **CI/ CD** |  |
| Roles | **Sub task** | **Effort required (person days)** |
| Sr. Cloud Engineer | Setup and configure Jenkins server for the application deployment |  |
| Sr. Cloud Engineer | Setup Jobs for various services |  |
| Sr. Cloud Engineer | Take care of roll back in case of failures |  |
| Sr. Cloud Engineer | Test the entire solution end to end |  |
| Sr. Cloud Engineer | Walk through of the entire branching and workflow of DevOps setup |  |
| Sr. Cloud Engineer | Corrections on feedback |  |
|  | **Total** |  |
|  |  |  |
|  | **For v5/6 Architecture (For all 7 customers)** |  |
| Roles | **Sub task** | **Effort required (person days)** |
| Sr. Cloud Engineer | Setup of EC2 instances according to architecture |  |
| Sr. Cloud Engineer | Setup ALB and configure it to route requests to servers |  |
| Sr. Cloud Engineer | Setup RDS with MySQL |  |
| Sr. Cloud Engineer | Support to customer on application setup. (Deployment server in case of Web/App/Api) |  |
| Sr. Cloud Engineer | Cloud Watch Alerts and Setup of Standard / Custom Metrics - ASG Metrics |  |
| Cloud Watch Dashboards Setup |
| Sr. Cloud Engineer | Configure GuardDuty and AWS Config |  |
| Sr. Cloud Engineer | Handover & Documentation. |  |
|  | **Total** |  |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | **Data Migration (For all 7 customers)** |  |
| Roles | **Sub task** | **Effort required (person days)** |
| Sr. Cloud Engineer | Migrate Data from Onpremise/Cloud to RDS |  |
| Sr. Cloud Engineer | Migrate Data from Onpremise/Cloud storage to S3 |  |
|  | **Total** |  |
| Project Management | | |
| Roles | **Sub task** | **Effort required (person days)** |
| Project Management | Project will conduct governance with Technical Team and Customer Stakeholders |  |
|  | **Total** |  |



Cost Contribution distribution between Partner, *CUSTOMER*, AWS:

|  |  |  |
| --- | --- | --- |
| Party | Contribution (USD) | % Contribution of Total |
| *CUSTOMER* |  |  |
| Partner |  |  |
| AWS |  |  |

## 

*CUSTOMER*

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# Appendix A – technical project plan for migration project

Migration Project Plan must demonstrate a consistent methodology and process applied through multiple migration phases as exemplified below. Though specific details may vary from project to project, a solid migration framework with major phases and work areas must be clearly identified and exercised consistently across all the projects.

The migration work scope and deliverables below are for guidance and demonstration purposes. Refer to AWS [Migration Consulting Competency Checklist](https://partnercentral.awspartner.com/sfc/#version?selectedDocumentId=0690h000003pc7y) for details. Actual project details may include other work items not limited to the following areas.

|  |  |
| --- | --- |
| Phase | Work Area and Deliverables |
| Assess | Migration Readiness Assessment (MRA) -  MRA determines *CUSTOMER* ’s readiness based on [AWS Cloud Adoption Framework](https://aws.amazon.com/professional-services/CAF/) comprised of Business, People, Governance, Platform, Security, and Operations perspectives.  Deliverables should include an assessment report with suggested actions and Statement of Work for executing the Mobilize phase next.  Total Cost of Ownership (TCO)–  The purpose of TCO analysis at assess phase is to perform rapid discovery and create TCO report.  Deliverables should include a detailed business case with focus on TCO modelling, business value assessment and detailed migration cost. |
| Mobilize | The purpose of Mobilize phase is to validate foundational migration capability and business case and plan migration project next. Mobilize may consist of the following work streams:   * Mobilize phase execution and migration planning * Portfolio discovery and analysis * Operations model assessment and design * Landing Zone design * Initial implementation Security specification * Migration pilot implementation as per [Appendix B](#_Appendix_B_–) * Migration team/organization establishment, Team RACI, training plan, and training activities * Detailed Business Case justification supported by Total Cost of Ownership (TCO) calculations   Deliverables should reflect the results of each of the work streams. |
| Migrate & Modernize | Migrate -  The migration project may consist of the following work areas on a per application basis:   * Design: migration pattern, application architecture, operations, cutover plan and process, reusable templates, migration tooling, and validation test plan * Migration: servers, databases, data, infrastructure services, followed by basic validation test * Integration: connectivity, application interfaces, operations (backup/restore, ...) * Validation: functional, performance, reliability, security, compliance * Cutover: meeting RTO and RPO with rollback plan   Modernize –  Modernization may be performed as part of migration work or post migration. The modernization project may consist of following areas on a per application basis:   * Assessment:Figure out motivation driver to modernize an application. Assess the amount of effort, time and cost to modernize. Assess the cost savings with modernization options (replatform, refactor, repurchase etc.) * Design: Migration pattern, target application architecture and AWS Services, operations, cutover plan and process, migration tooling and validation test plan. * Development: Develop or modify application to use AWS managed platform. * Validation: functional, performance, reliability, security, compliance * Cutover: meeting RTO and RPO with rollback plan   Optimize -  It may involve one or more of the following work areas.   * Cost optimization (e.g., right-sizing services, resource reservation, leveraging spot instance, monitoring and analyzing service usage and cost) * Application optimization (e.g., performance, functional, design) * Process optimization (e.g., development process automation) * Operational optimization (e.g., operations support systems, infrastructure as code))   Deliverables should reflect the results of each of the work areas. |
| Completion | Reach the project closure with the *CUSTOMER* .  Deliverables should include *CUSTOMER* ’s acceptance letter and training materials. |

# Appendix B – Pilot Migrations in Mobilize phase

The Application Migrations work stream defines an agile approach to migrate applications to AWS during the Mobilize Phase. This work stream helps *CUSTOMER* s get hands-on experience in migrating different types of applications to AWS using standard migration tools and process, working together with AWS and/or Partner migration experts. It also helps bring some of the outputs from other work streams, such as Security, Risk & Compliance, Operational Integration, and Landing Zone together through live-migrations.Although the number of applications migrated in this work stream is normally no more than 10, it is largely indicative of how the majority of applications can be migrated as detailed discovery and analysis is completed for the rest of the portfolio.

**General Guidelines for selecting applications for Pilot**

Applications that are web-based (accessed via web browsers), 2 or 3tiered (web-app-database); running a supported operating systemon virtual or physical hardware; have no dependency (or are loosely coupled) on other applications in data center/on-prem; have little (less than 1 Mbps) connectivity needs back to data center or *CUSTOMER* has Direct Connect; no shared data storage (SAN/NAS) with other applications; runs on AWS RDS supported databases ; Database size less than 20GB; not to exceed 20 server instances; preferably, stateless-architecture (can be deployed in a clustered mode using load balancer); preferably, at least 50% test automation for expedited testing/certification; preferably, well understood and documented architecture; acceptable (less than 2 hours) downtime.

In addition to above guidelines, there are other factors to be considered based on *CUSTOMER* ’s process, application criticality, commitment, SME availability.

General Examples of applications preferred for Pilot Migrations:

Online properties/Marketing sites

Intranet applications built on n-tiered architecture

Content Management Systems

Web Applications

Marketing, Sales and Service applications

General Examples of applications not recommended for Pilot Migrations:

ERPs and CRMs– SAP, PeopleSoft, Oracle ERP, Microsoft Dynamics, Seibel

Financial Reporting Systems

Data Warehouse

Information Lifecycle Management, ETL, B2B data exchanges,

EAI and middleware

Citrix-based workloads

**Outcome**

*CUSTOMER* resources trained in migration tools, AWS services, monitoring, and best-practices

*CUSTOMER* ramped-up on scalable migration factory framework