IBM **Services**

**THOR BATCH**

Design Document

Boeing Application Modernization POC

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# Application Information​

THOR app is used to compare & review the graphics data from GEMINI and text data from AIRES. THOR batch validates the graphical figures and reports and updates THOR database. Processes graphics data and textual data​.

## Application Contacts

|  |  |  |
| --- | --- | --- |
| **Role** | **Name** | **Contact Details (email, phone)** |
| **Application SME / Admin** |  |  |
| **Application Owner** | Brenda Dixon |  |
| **Lead CIO Architect** |  |  |
| **DevOps Team** |  |  |
| **Lead Technical Architect** |  |  |
| **Lead Security Architect** |  |  |
| **Architect** |  |  |
| **DBA** | Rob Smalt |  |
|  |  |  |

## Application Details

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | THOR Batch | | |
| **Modernization Method** | Refactor | **Complexity** | Medium |
| **AEC** | 3 | **Recovery Level** |  |
| **RTO (hrs.)** |  | **RPO (hrs.)** |  |
| **ETTR (hrs.)** |  | **ERP (hrs.)** |  |
| **Nº of Active Users** | 1 | **Nº of Total Users** | 1 |

## Context Diagram

This diagram shows the context of all 22 applications in scope for the POC.

|  |
| --- |
| THOR |

Diagram - Context Diagram

## Zoomed in Context Diagram for THOR ‘As Is’

|  |
| --- |
| A map of a sign  Description automatically generated   1. Retrieve graphics data from GEMINI​ 2. Retrieve ADATA from AIRES​ 3. Validate and push the data to THOR database   /var/folders/n3/qmf19prn5f9b3qgk8yhj5gtm0000gn/T/com.microsoft.Word/Content.MSO/CA431D1E.tmp |

Diagram - Zoomed in Context Diagram

# Solution Scope Definition

Minimal Viable Product Scope includes:

# Architecture Overview

Diagram - Architecture Overview Diagram

# Component Design Specification

## User Interface (UI) Specification

## User Interface (UI) Interaction Diagrams and Mapping

# API Model Specification

As part of Boeing’s Application modernization, IBM proposes to build and use APIs that decouple systems from each other. This section provides a high-level information on how THOR Batch API behaves and how the API links with other APIs.

This document is for architects and developers responsible for building APIs and provides base-level guidance on RESTful APIs and style for the contracts.

IBM proposes Restful APIs as part of the Event Sourcing Fabric Framework. REST (Representational State Transfer) is an architectural style for APIs that relies on the HTTP protocol and JSON data format to send and receive messages. REST utilizes CRUD (Create, Retrieve, Update, and Delete) to keep API calls as simple as possible to understand.

The advantages of REST include:

* **Flexibility**: Although REST is most commonly implemented with HTTP and JSON, developers are by no means obligated to use them. Websites can send back responses using data formats including JSON, XML, HTML, or even plaintext-whatever best suits their needs.
* **Speed**: Because it tends to use much less overhead, REST APIs are typically significantly faster than SOAP. While the differences might be imperceptible for a single request, the disparity grows larger and larger as you place more and more requests.
* **Popularity**: REST has reached critical mass on the Internet. Major websites such as Google, Twitter, and YouTube all use REST APIs for users to send and receive messages. Due to this familiarity, it’s typically easier for developers to get up and running with REST.
* **Scalability**: Thanks to their speed and simplicity, REST APIs usually perform very well at scale.

# Risks, Assumptions, Issues and Dependencies

## Risks

|  |  |  |
| --- | --- | --- |
|  | **Risk** | **Mitigation** |
| 1​ | Performance Metrics were not provided to IBM for ATEAM apps for target platform comparison​ | IBM team to work closely with CDG team to establish Performance Metrics ​ |
| 2​ | THOR / Batch application is currently supported on Windows 7 O/S which is coming End of Life Jan 2020.  Libraries may not be compatible with Windows 10 which is the Boeing standard​ | The application will be refactored based on the selected modernization option which would eliminate the need for Windows 7 O/S​  ​ |
| 3​ | Microsoft no longer provides security updates and technical support for .NET 4.5 framework​ | Remediate code based on Boeing’s approved .NET framework (.NET 4.7.2/4.8 or .NET Core 2.0/3.0)​ |
| 4​ | Communication channel between AIRES ADATA DB server and THOR Batch/DB server post migration may not function as expected​  ​ | IBM team to work closely with Boeing/CDG to define a solution for establishing communication between AIRES ADATA DB server and THOR Batch/DB server that meets BEN requirements ​ |
| 5​ | AutoCAD v14 is not compatible with Windows 10 O/S​ | Upgrade to Boeing’s approved version of AutoCAD or alternative;​  Convert existing DWG and DXF files to the appropriate format​ |

## Assumptions

|  |  |
| --- | --- |
|  | **Assumption** |
| 1​ | IBM will leverage existing transfer methods (Axway Products, Web Services, SFTP) to migrate data from CDG to BEN / Azure Gov (Internal) platform​ |
| 2​ | Any all COTS/Custom code is compatible with Boeing Standards and Target Platform.  If/When this assumption is false; IBM will work with CDG/Boeing to propose an alternative​ |
| 3​ | Application is available 24x6. IBM can perform cutover to the target platform outside this window​ |
| 4​ | THOR application can leverage approved transfer methods to receive data from AIRES and GEMINI​ |
| 5​ | THOR Service accounts and user accounts will port over to Boeing domain with same permissions to run the application​ |

## Issues

## Dependencies

# Architecture Decisions

## SQL Server disposition

|  |  |  |  |
| --- | --- | --- | --- |
| **Subject Area** |  | **Topic** |  |
| **Architectural Decision** | THOR Batch SQL Server disposition | **ID** |  |
| **Issue or Problem Statement** |  | | |
| **Assumptions** |  | | |
| **Motivation** |  | | |
| **Alternatives** | * Option 1: * Option 2: * Option 3: | | |
| **Decision** |  | | |
| **Justification** |  | | |
| **Implications** |  | | |
| **Derived Requirements** |  | | |
| **Related Decisions** |  | | |

## Security solution / mechanism for THOR Batch application

|  |  |  |  |
| --- | --- | --- | --- |
| **Subject Area** |  | **Topic** |  |
| **Architectural Decision** | Security solution / mechanism for THOR Batch application | **ID** |  |
| **Issue or Problem Statement** |  | | |
| **Assumptions** |  | | |
| **Motivation** |  | | |
| **Alternatives** | * Option 1: * Option 2: * Option 3: | | |
| **Decision** |  | | |
| **Justification** |  | | |
| **Implications** |  | | |
| **Derived Requirements** |  | | |
| **Related Decisions** |  | | |

## Integration architecture with CDG systems (ADATA, SSRS)

|  |  |  |  |
| --- | --- | --- | --- |
| **Subject Area** |  | **Topic** |  |
| **Architectural Decision** | Integration architecture with CDG systems (ADATA, SSRS) | **ID** |  |
| **Issue or Problem Statement** |  | | |
| **Assumptions** |  | | |
| **Motivation** |  | | |
| **Alternatives** | * Option 1: * Option 2: * Option 3: | | |
| **Decision** |  | | |
| **Justification** |  | | |
| **Implications** |  | | |
| **Derived Requirements** |  | | |
| **Related Decisions** |  | | |

# Logical Diagram

## ‘As Is’ Logical Diagram

|  |
| --- |
| A screenshot of a cell phone  Description automatically generated |

Diagram - 'As Is' Logical Diagram

## ‘To Be’ Logical Diagram

|  |
| --- |
|  |

Diagram - 'To Be' Logical Diagram

# Technology Stack

This section details all technology and software used at CDG (As Is) and future state (To Be).

## ‘As Is’ Technology Stack

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Vendor** | **Version** | **Comments** |
| SQL Server | Microsoft | 2012 |  |
| Report (SSRS) | Microsoft | 2012 |  |
| Servers (Batch Jobs) | Windows Scheduler | 2012 |  |
|  |  |  |  |
|  |  |  |  |

## ‘To Be’ Technology Stack

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Vendor** | **Version** | **Comments** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# Infrastructure Stack

## ‘As Is’ Infrastructure

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **OS** | **Domain** | **Location / Site** | **P or V\*** | **Environment**  **(Dev, Test, Prod)** | **CPUs** | **Mem (GB)** | **Storage (GB)** |
| Windows 7 Professional​ | Desktop (Client)​ |  | P | Standard Boeing Workstation | | | |
| SQL Server 2012 on Windows 2012 64 bit Server​ | DB Server |  | V | Prod | 2 | 6 GB | 493 GB |
| SQL Server 2012 on Windows 2012 64 bit Server​ | DB Server |  | V | UAT | 2 | 6 GB | 459 GB |
| SQL Server 2012 on Windows 2012 64 bit Server​ | DB Server |  | V | Dev | 2 | 8 GB | 325 GB |
|  |  |  |  |  |  |  |  |

**\* P or V:** Physical or Virtual

## ‘To Be’ Infrastructure

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Server Name** | **Domain** | **Location / Site** | **P or V\*** | **Environment**  **(Dev, Test, Prod)** | **CPUs** | **Mem (GB)** | **Storage (GB)** |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

**\* P or V:** Physical or Virtual

# Interfaces

## ‘As Is’ Interfaces

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Type** | **Source** | **Target** | **Input / Output** | **Automated / Manual** | **Frequency** | **Direction** | **Protocol** | **Port** | **File Size** |
| Upstream​ | GEMINI Shared Folder​ | THOR / Batch​ | Input​ | Manual​ | On Demand​ | Pull​ | SFTP​ | 22​ | ~ 1 MB |
| Upstream​ | ADATA DB server​ | THOR / Batch​ | Input​ | Manual​ | On Demand​ | Pull​ | ODBC​ | 1433​ | 1-10 MB |

## ‘To Be’ Interfaces

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Type** | **Source** | **Target** | **Input / Output** | **Automated / Manual** | **Frequency** | **Direction** | **Protocol** | **Port** | **File Size** |
|  |  |  |  |  |  |  |  |  |  |

# Middleware

## ‘As Is’ Middleware configuration

|  |  |  |  |
| --- | --- | --- | --- |
| **Software** | **Version** | **OS** | **Comments** |
| THOR application executable​ | N/A​ | Windows 7​ | Executable for THOR/Batch application​ |
| .NET Framework​ | 4.5​ | Windows 7​ | Framework for C# application​ |

## ‘To Be’ Middleware configuration

|  |  |  |  |
| --- | --- | --- | --- |
| **Software** | **Version** | **OS** | **Comments** |
|  |  |  |  |

# Databases

## Databases Instances

|  |  |  |  |
| --- | --- | --- | --- |
| **Component** | **Vendor** | **Version** | **Service Pack** |
| **Database** | Windows SQL Server | 2012 | SP2 |
|  |  |  |  |

## ‘As Is’ SQL Configuration

## ‘To Be’ SQL Configuration

# DevOps

## ‘As Is’ DevOps Process

### Application Deployment

0

### Tool used for Source Control

0

### Tool used for code/vulnerability scanning

0

### Tool used to build the application for a continuous release and deployment

0

### Automated infrastructure deployment

(Yes/No)

### Application Compliant with security policies and ready for deployment in Production

0

### Tool used for a build repository

0

### Current process for updating the applications for all applications instances

0

## ‘To Be’ DevOps Process

# Backups

## ‘As Is’ Backups

### Database Backups

Full backups on weekend, daily incremental backups.

### Application Code Backups

Application code is stored in SubVersion and is backed up based on SubVersion Backup schedules.

## ‘To Be’ Backups

# Monitoring and Logging

## ‘As Is’ Monitoring and Logging

### Infrastructure Monitoring

<Place Holder>

### Application Monitoring

<Place Holder>

### Security Logging (i.e. Splunk)

<Place Holder>

### Application Logging (i.e. ELK)

<Place Holder>

### Server Monitoring

SolarWinds

## ‘To Be’ Monitoring and Logging

# Disaster Recovery

## ‘As Is’ Disaster Recovery

Restoration is performed using backups on the production environment.

## ‘To Be’ Disaster Recovery

# Operation Information

## ‘As Is’ Operational Procedures

### Batch Process

<Place Holder>

### Scheduled Tasks

<Place Holder>

### Failover / DR Scripts

<Place Holder>

### Maintenance Windows

Saturday 7PM - Sunday 7PM PT

### Application Level Support

<Place Holder>

## ‘To Be’ Operational Procedures

### Batch Process

### Scheduled Tasks

### Failover / DR Scripts

### Maintenance Windows

### Application Level Support

# Testing

## ‘As Is’ Testing

|  |  |  |
| --- | --- | --- |
| **Type** | **#C and .NET** | **SSRS Report** |
| Functional Testing | Manual | Manual |
| Integrated Testing | Manual | Manual |
| Performance Testing | Not being performed | Not being performed |
| Stress Testing | Not being performed | Not being performed |
| Regression Testing | Not being performed | Not being performed |
| User Acceptance Testing | Manual | Manual |
| Test Tools | Excel Spreadsheets | Excel Spreadsheets |
| Number of Test Cases | Varies by functionality | Varies by functionality |
| Testing Skills | CDG App SME | CDG App SME |
| Assessment/Recommendation | CDG currently performs a high degree of undocumented manual testing procedures.  In preparation for merging with Boeing; IBM recommends automating all testing procedures wherever possible using the Boeing standards for each test case. | |

## ‘To Be’ Testing

# Security

## ‘As Is’ Identity and Access Management Integration

<PlaceHolder>

## ‘To Be’ Identity and Access Management Integration

## ‘As Is’ Application Single-Sign-On (SSO) Integration

<PlaceHolder>

## ‘To Be’ Application Single-Sign-On (SSO) Integration

## ‘As Is’ Certificates

<PlaceHolder>

## ‘To Be’ Certificates

## ‘As Is’ Current State and Comments

|  |  |  |
| --- | --- | --- |
| **​** | **Current State​** | **Recommendation / Comments​** |
| 1​ | Windows 7 Desktop Client​ | Recommendation is to upgrade to Windows 10​ |
| 2​ | User authorization rules are contained within THOR application​ | Recommendation is to grant role based access to users utilizing IAM services ​ |
| 3​ | Application is secured by enforcing CDG domain based user authentication​ | User Authentication will need to be converted to Boeing’s Federated ID​ |
| 4​ | SonarQube is used for code scanning/vulnerability checks on the codebase​ | Coverity and SonarQube are approved code scanning/vulnerability tools on Boeing’s network; no changes are expected​ |
| 5​ | CDG users are provided Boeing laptops to use VDI (Virtual Desktop Infrastructure) for accessing the application​ | Once application runs in BEN, VDI will not be required for on-shore users to access the application​ |
| 6​ | No connections external to network are allowed to/from the application​ | Access to application will remain internal to Boeing​ |
| 7​ | Internal application only​ | Off shore users access in the target platform is contingent on the modernization option​ |

# Performance

Performance metrics not available for ATEAM applications.

# Data Migration

## Provisioning

## Data Migration

* Establish a connection between CDG Bitbucket and Boeing GitLab source code repositories for moving THOR application, batch and report source code.​
* Export THOR DB to target platform using Managed File Transfer (MFT) and import the DB to the provisioned managed SQL server instance.

# Appendixes

# Glossary

|  |  |
| --- | --- |
| **Acronym** | **Definition** |
| AEC | Availability Environment Classification |
| AMFT | Amplified Managed File Transfer |
| ‘As Is’ | Current state of application |
| BEN | Boeing Enterprise Network |
| BoM | Bill of Materials |
| BPI | Boeing Proprietary Information |
| CDG | Continental Data Graphics |
| EAR-LR | Export Administration Regulations – License Required |
| EAR-NLR | Export Administration Regulations – No License Required |
| IPC | Illustrated Parts Catalog |
| ITAR | International Traffic and Arms Regulation |
| MFT | Managed File Transfer |
| MFTS | Managed File Transfer Services |
| PII | Personally Identifiable Information |
| SFTP | Secure File Transfer Protocol |
| ‘To Be’ | Future state of application |

|  |  |
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