ORION - Interactive Optical Network

Thesis submitted in partial fulfillment of the
Requirements for the Degree of

MASTER OF TECHNOLOGY

IN

ELECTRONICS AND COMMUNICATION ENGINEERING WITH SPECIALIZATION IN INTERNET OF THINGS (IOT)

By

Sanjay Kumar Singh (212055)

UNDER THE GUIDANCE OF

Prof. Dr. Rajiv Kumar & Mr. Mahitosh Patankar

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

May 2023

TABLE OF CONTENTS

CAPTION	PAGE NO.
DECLARATION	i
ACKNOWLEDGEMENT	ii
LIST OF ACRONYMS AND ABBREVIATIONS	iii
LIST OF SYMBOLS	iv
LIST OF FIGURES	v
LIST OF TABLES	vi
ABSTRACT	vii
CHAPTER-1: INTRODUCTION	**14**
• 1.1 Project Overview	14
• 1.2 Dissertation Scope and Status	15
• 1.3 Roles and Responsibilities	15
CHAPTER-2: TECHNICAL LANDSCAPE	**17**
• 2.1 Architecture overview	17
• 2.2 Languages	18
2.2.1 Front End Languages	18
2.2.2 Back End Languages	18
• 2.3 Delivery Model	18
2.3.1 Frameworks and data flow	18
2.3.2 Delivery And Development	21
CHAPTER-3: ANALYTICS & CONSIDERATION	**22**
• 3.1 User stats and automation	22
• 3.2 Re-Platforming consideration	41
CHAPTER-4: CONCLUSION	**42**
• 4.1 Benefits	42
• 4.2 Roadmap	42
• 4.3 Project plan adherence and status	43
REFERENCES	
APPENDIX	

DECLARATION

I hereby declare that the work reported in the M. Tech Dissertation Report entitled ***"ORION - Interactive Optical Network"*** *submitted at the* ***Jaypee University of Information Technology, Waknaghat, India*** *is an authentic record of our work carried out under the supervision of* ***Prof. Dr. Rajiv Kumar and Mr. Mahitosh Patankar.*** *We have not submitted this work elsewhere for any other degree or diploma.*

Sanjay Kumar Singh
Roll: 202055

This is to certify that the above statement made by the candidates is correct to the best of my knowledge.

Prof. Dr. Rajiv Kumar
(Professor and Head of Department of ECE, JUIT)
Date:

Mr. Mahitosh Patankar
Head of Engineering and Delivery, BT)
Date: 19th May 2023

ACKNOWLEDGEMENT

First and foremost, I would like to thank **Prof. Dr. Rajiv Kumar** (Prof and Head Dept. of ECE, JUIT) for his vision and support. Prof. Rajiv has always been great in his vision and has been providing necessary guidance on the wider IoT space and also the practical aspects of the internship and its objectives.

I am also thankful to **Mr. Mahitosh Patankar**, who is Head of Engineering and Delivery for the 'Digital Engineering Experience' unit. He has close to 19 years of industry experience and is a B. Tech from IIT Madras and MBA from IIM Bangalore. Mr. Mahitosh has been an excellent mentor and supervisor from the industry, guiding me in broad solution approach and from wider relevant technologies. He has not only given ample opportunities in the current project but also has been guiding on stakeholders' management and the technical DevOps team.

Overall internship in the industry has been full of learning and satisfaction and for which I am highly thankful to the University and the Department of Electronics and Communication Engineering for having been allowed to do my 3rd and 4th semester internship in industry, which has given me an opportunity to widen my thought process and horizon.

LIST OF ACRONYMS AND ABBREVIATIONS

IoT: Internet of Things
ORION: Openreach Interactive Optical Network
ML: Machine Learning
AWS: Amazon Web Services
GCP: Google Cloud Platform
GG: GoldenGate
ADG: Active Data Guard
ADFS: Active Directory Federation Services
FTTP: Fibre to the Premises
FTTC: Fibre to the Cabinet
MDU: Multi-Dwelling Unit
CSP: Communication Service Provider
BT: British Telecom
VM: Virtual Machine

LIST OF FIGURES

Fig 1.2.1 Shows the overall project span and associated objectives.
Fig 2.1.1 Depicts current application architecture.
Fig 2.1.2 Shows target application architecture post current stability phase
Fig 2.3.1.1 Manifests interaction between front end and backend
Fig 2.3.1.2 Data flow for online app version
Fig 2.3.1.3 Data flow for offline app version
Fig 2.3.2.1 DevOps CI-CD Pipeline
Fig 2.3.2.2 Field Visits to understand key pain areas and user experience.
Fig 3.1.1 User Transactions Hits
Fig 4.3.1 Project plan and adherence

ABSTRACT

Pursuing a masters in IoT after 15 years of industry experience, was a well-thought decision and was aimed at continuing my learning curve. I am glad that I chose to return to my alma mater due to the esteemed faculties and able leadership of the Head of the Department of Electronics and Communication.

This dissertation is a summary of my work done as part of my 3rd and 4th semester industry internship.

The broader aim of the project was to achieve below set organizational goals set by my industry supervisor:

To help progress deliveries and optimize the DevOps stack for an application called ORION; which is aimed at achieving Network design and survey and thereby helping the organization to meet its target for fast-fibre (FTTP/FTTC etc.) rollout.

Task 1: To improve service using automation – alerts, traps automated reports
Task 2: To do field visits to understand the network requirement and broad plan
Task 3: To understand user experience and suggest improvements
Task 4: To performance test application for future usage patterns and volumetrics
Task 5: To create a re-platforming plan for application for strategic demands
Task 6: Overall delivery management from both technology and demand delivery

Agile methodologies have been adopted where the team is split across different squads and each one focuses on specified release-wise goals. Each release cycle consists of 2 sprints of 2 weeks each.

Industry-benchmarked methods have been used to undermine the quality of results. Aligning with the capacity the delivery is committed and then the predictability of delivery timeline adherence along with escapade defects defines the broad team performance. The corroboration against the acceptance criteria decides the delivery efficacy.

I managed to achieve the goals/tasks set during the internship which was full of learning ably guided by my academic and industry supervisors.

CHAPTER 1

INTRODUCTION

1.1 Project Overview

The organization with which the internship is being done builds and maintains the UK's digital network and aims to connect 25m premises with fast-fibre connectivity by December 2026.

The existing Network plan and build processes were completely manual with paper packs for the survey and build and reaching the ambitious target of 25m would certainly not have been possible using outdated technology and processes. This huge target demanded a complete digital solution with agility and mobility for the users for easy consumption and update of the survey details on real-time basis. To achieve this a new leading-edge digital technology Product Orion (Openreach Interactive Optical Network) was launched to expedite the fibre rollout.

The project gave a complete refresh to the network plan and build processes. It's an intuitive tablet/mobile/web app which enables flexible network plan and build processes. Orion replaced the existing manual processes and digitized the plan and build journey, helping planners, surveyors, and field engineers (Internal and partners) to deliver rapid fibre rollout to meet the organization's objective. Orion's innovation brings platforms, systems, and tools together in a smooth and seamless end-to-end process for a faster fibre rollout. Orion also helped with mobile planning and amending our network records in real-time in our ever-changing network landscape.

Since Orion needed to be accessible to the wider user groups across regions, hence it warranted a cross-platform solution (device and platform agnostic) that can be easily consumed by the users (using BYOD implementation – bring your Own Device). Based on this requirement the technology stack was chosen so that Orion runs cross platform with leading-edge technology using ReactNative, Redux, Typescript, Node JS and low code platform-based, cross-platform app that would run on iOS, Android, and Windows.

Orion, driven by a new way of working, pioneered change in business processes by bringing key automation/digitization:

- Existing Waterfall delivery to complete agile delivery
- Starting from network design creation, paper instructions for the survey and paper instructions for the build were completely manual. Orion enabled fully automated network design and digital survey and build packs (estimates and job info)
- Orion enabled network plans and records to be updated in real-time from the field and also automated network record updates back to the physical inventory system after survey completion.
- Business continuity using the offline capability to perform survey and updates (which is key to enabling service if even the remotest area of the UK where there are no network connectivity)
- Orion helped in automated network quality checks based on the details gathered from the field. All these capabilities enabled faster fibre rollout.
- Developed Complex algorithm to optimize the spine network (core telecom network in the broader network topology) and automate spine planning process.

1.2 Dissertation Scope and Status

To help progress deliveries and optimize the DevOps stack for an application called ORION; which is aimed at achieving Network design and survey and thereby helping the organization to meet its target for fast fibre rollout.

Task 1: To improve service using automation – alerts, traps automated reports

Task 2: To do field visits to understand the network requirement and broad plan

Task 3: To understand user experience and suggest improvements

Task 4: To performance test application for future usage patterns and volumetrics

Task 5: To create a re-platforming plan for application for strategic demands

Task 6: Overall delivery management from both technology and demand delivery

The overall project timelines and defined objectives are detailed below.

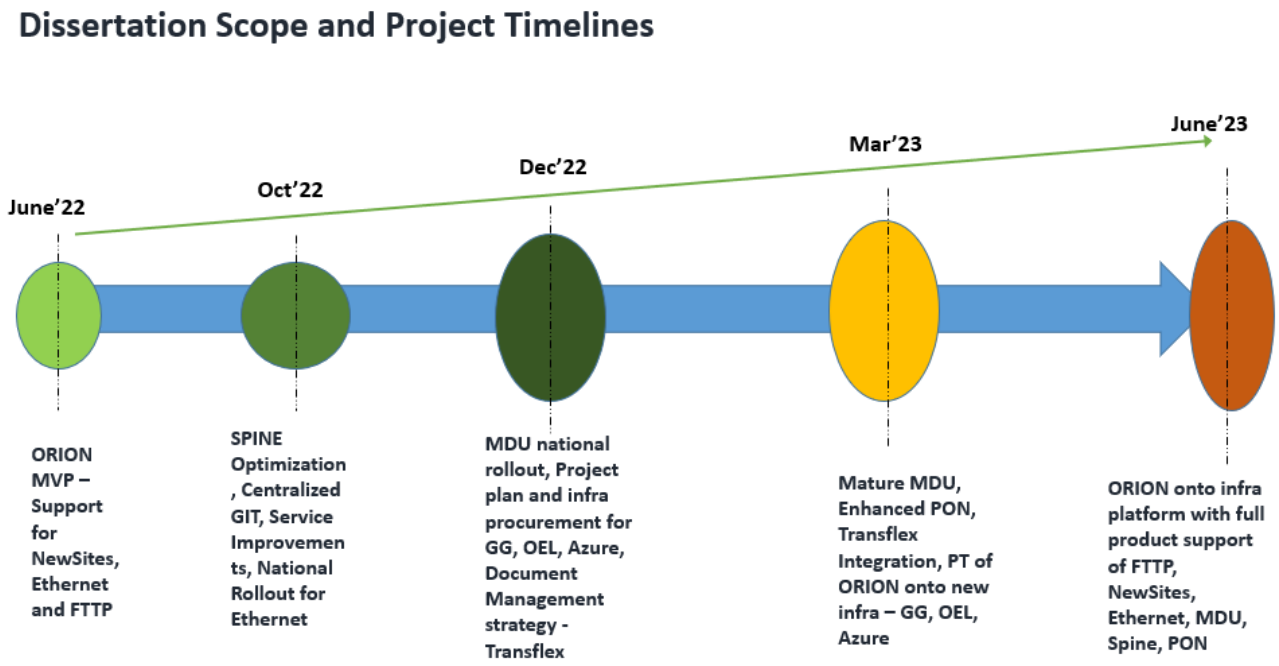

Fig 1.2.1 Dissertation Scope and Project Timelines

1.3 Roles and Responsibilities

Since it's a broader team effort and so many members working together towards achieving common objectives, hence its very important to define the precise role played by me in the team and also the associated responsibilities.

- Technical Delivery Management
    - To provide architectural roadmap and decisions
    - To ensure coordination amongst stakeholders
    - To ensure committed delivery timelines are adhered to

- Agile Chapter Lead
    - Evaluate and promote agile resources
    - Coach and knowledge management of agile resources
    - Participate in design discussion, dev approach and Ops

- Architectural/Technological decisions/implementations
    - Authentication via Azure AD than SiteMinder
    - Cross-site database sync up via GoldenGate than Active Data Guard
    - Cloud-based document management – Transflex
    - EoSL mitigation – Oracle DB 12C to 19C migration, OEL 7 to 8
    - Service improvements
        - Automated reporting and alerting, Self-serve
        - Centralized GIT, Performance testing, Improving DevOps maturity, Mobius Integration

CHAPTER 2
TECHNICAL LANDSCAPE

2.1 Architecture overview

High-Level Architecture – AS IS

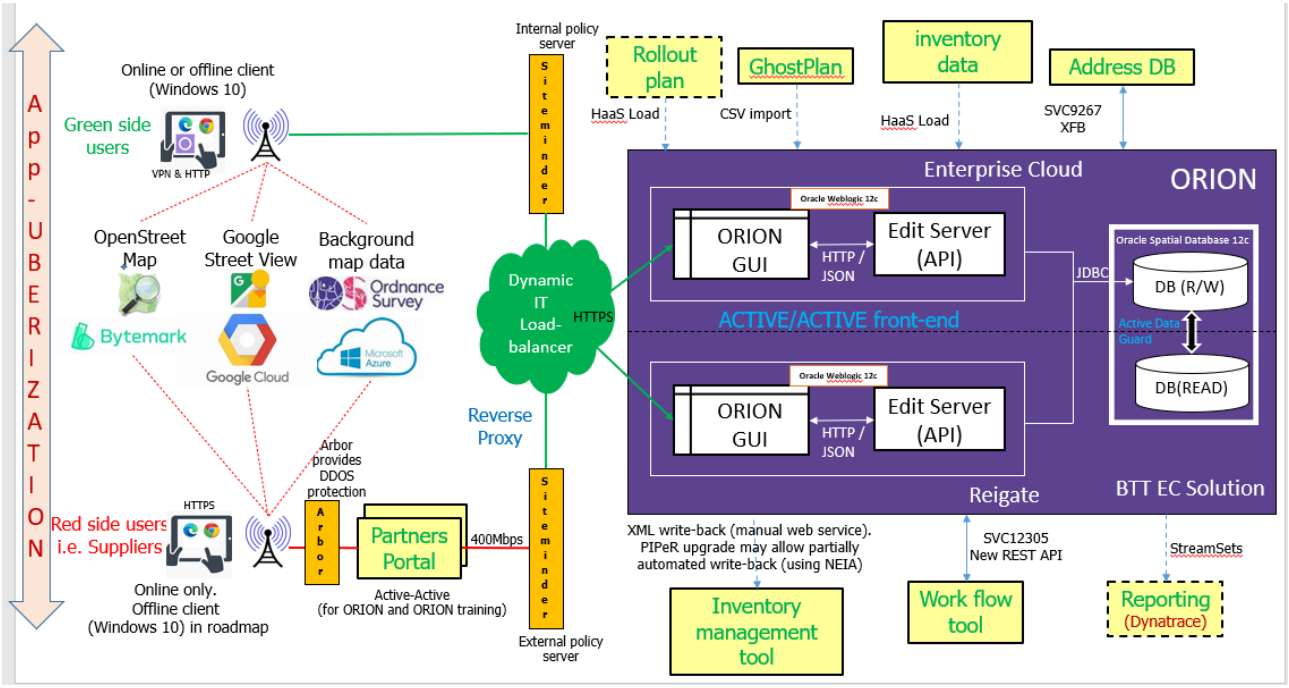

Fig 2.1.1 As Is Architecture

High-Level Architecture – TO BE

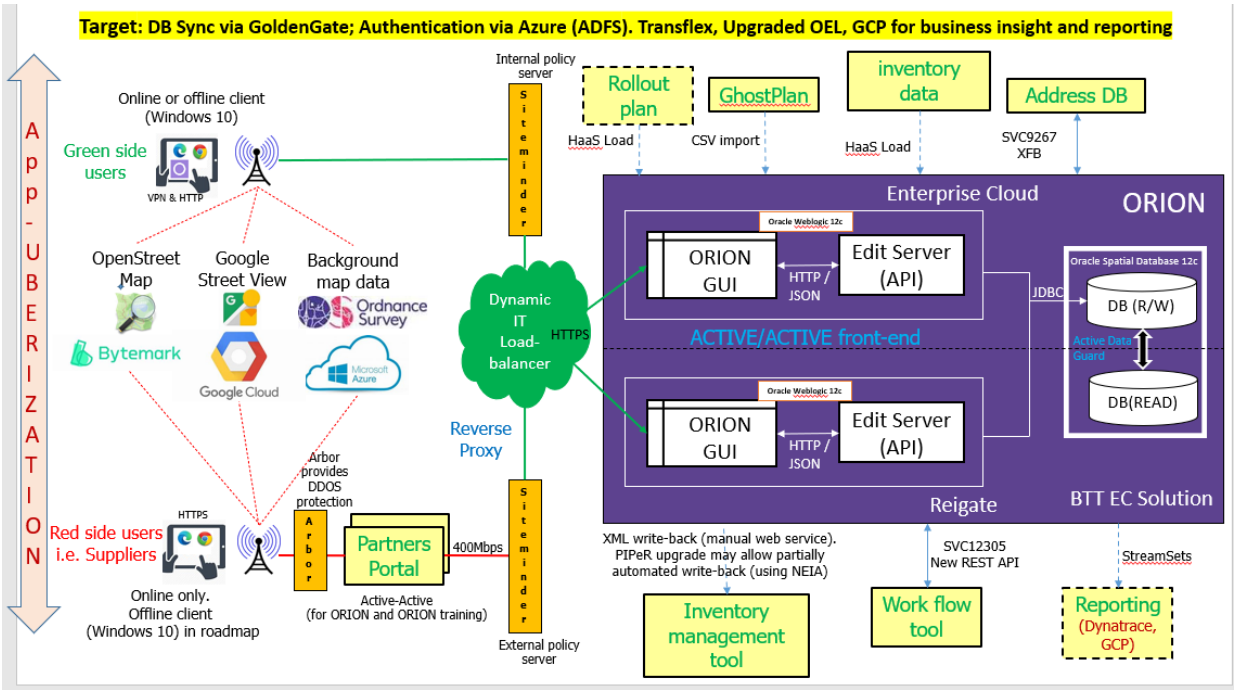

Fig 2.1.2 Target Architecture

2.2 Languages

The application required platform and device-agnostic behavior and hence the choice of languages became very critical both at the front end and back end

2.2.1 **Front End Languages**

- TypeScript – Typed JavaScript – Lot of advantages over JavaScript
- ReactJS – For UI Components
- Redux with Thunk – For global state management
- OpenLayers – Mapping library
- Styled Components – CSS in JavaScript
- Electron – Packages the portal as an app
- Yarn – A Package manager and executes the scripts

2.2.2 **Back End Languages**

- Kotlin - is a statically typed language which is very easy to read and write. It has a much simpler and shorter code than Java's code for the same problem.
- Ktor - is an asynchronous framework for creating microservices, web applications, and more. It's fun, free, and open source.
- Arrow – Exception handling
- Kotest – Unit testing
- Oracle Spatial – To Store ORION data.
- Elastic Search – To store search data.

2.3 Delivery Model

Overall delivery follows Agile methodologies where various vendors come together to create an optimized ecosystem that is self-driven. Typical roles consist of Product owner, Delivery manager, Scum master, Chapter leads, Designers, Developers, and Test teams.

2.3.1 Frameworks and data flow

Front end and backend interaction shown below manifests a Single Page application implementation exchanging data with the backend including the network inventory system (represented below as Piper)

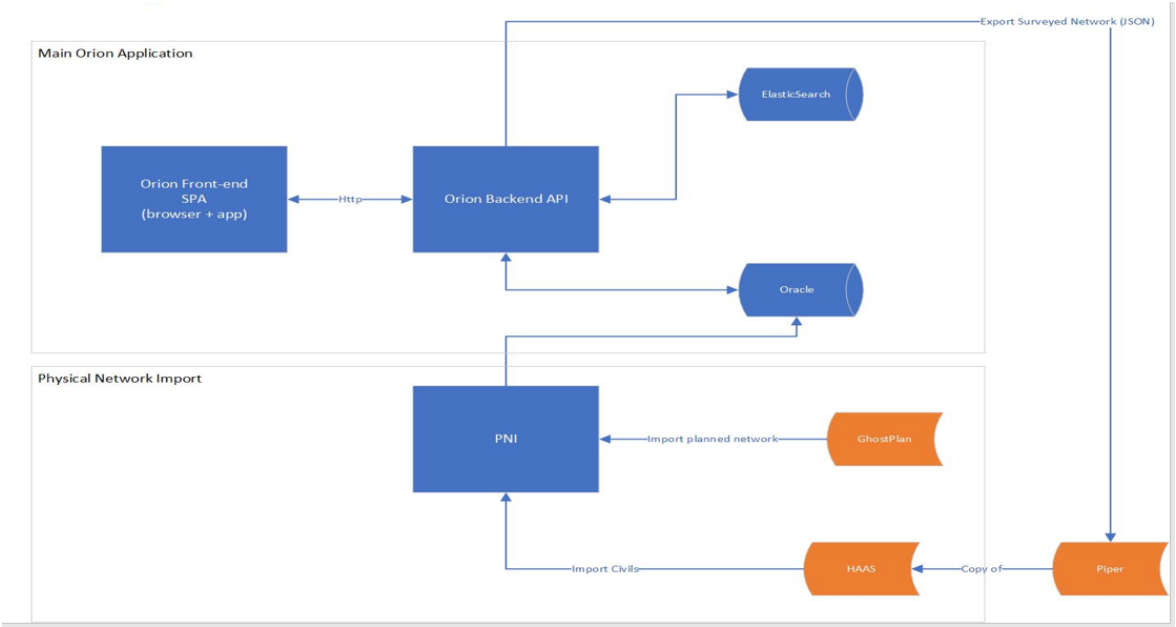

Fig 2.3.1.1 Framework and data flow

The application has both a browser and an app version.
The browser version has further two variants:
Online: when the network availability is there and
Offline: this is very important from a continuity perspective. Even when the network connectivity is not there the users can work offline and then commit back all the changes, when the connectivity is restored or available.
The below interaction is for the online version of the app

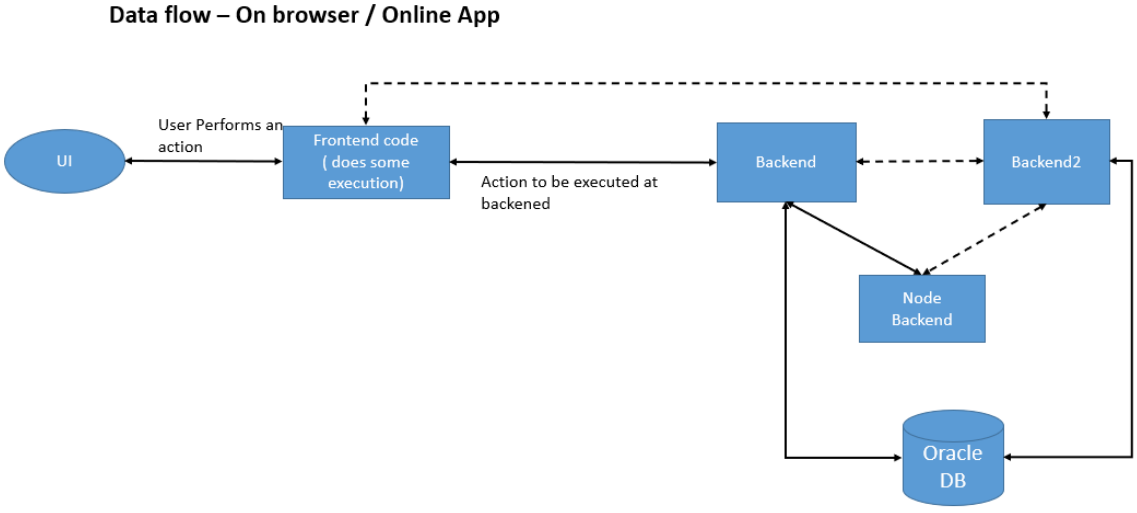

Fig 2.3.1.2 Online app data flow

Data flow – Offline App

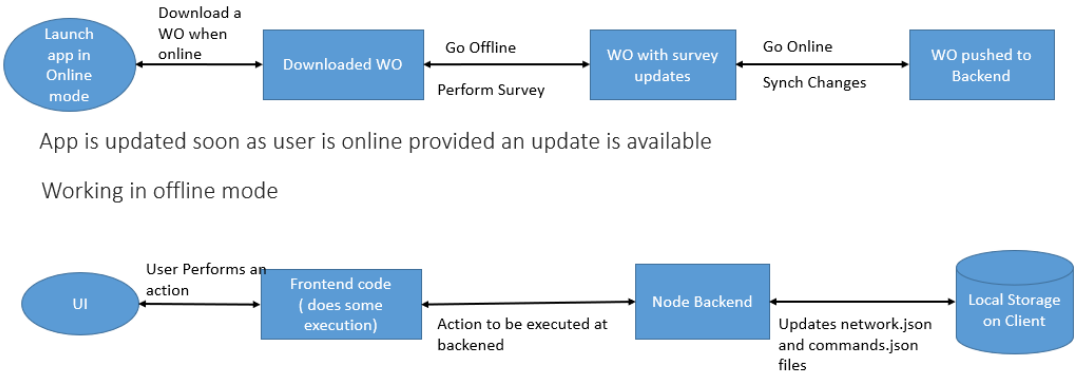

Fig 2.3.1.3 Offline App Data flow

The below view represents the User Interface of the application once loaded. It has various sections to manage a work order. It has a search bar which is a free text using which users can search based on postcode, work order reference, or any identifiable reference.

The application has an ability where the user can upload any supporting or compliance document. The main body of the interface shows the network layout and can be modified by the network planner and surveyors.

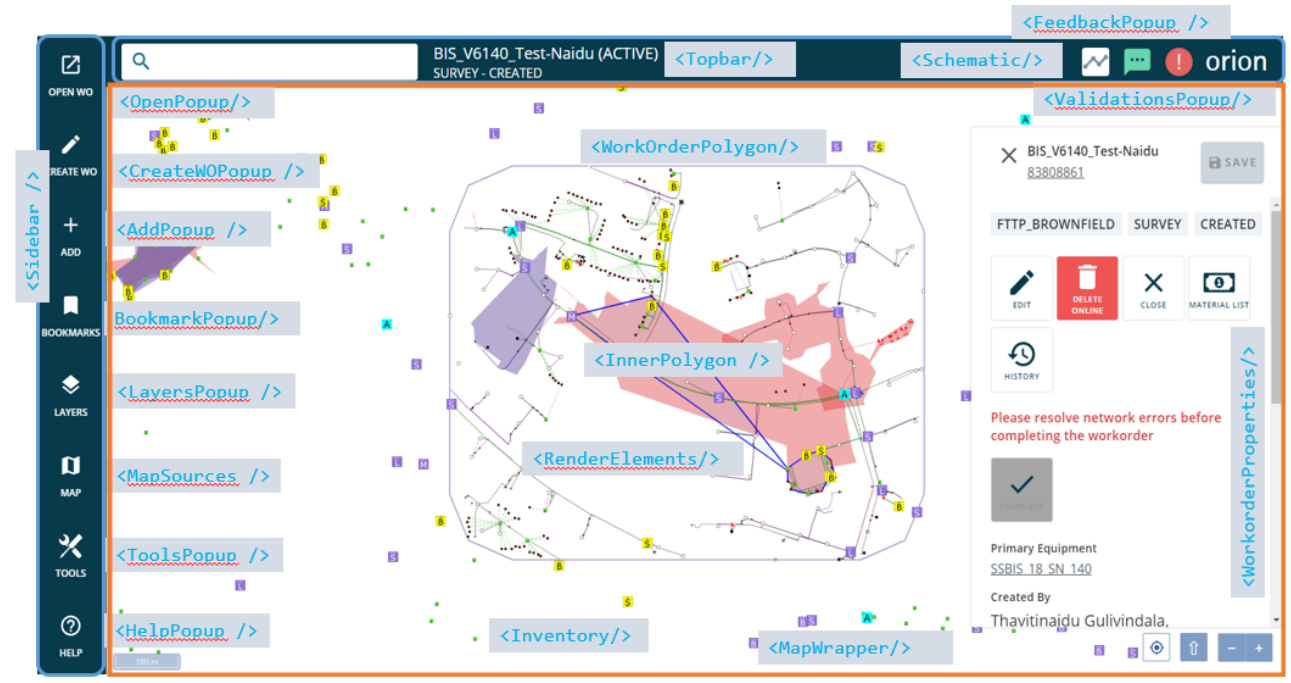

Fig 2.3.1.4 Application page layout

2.3.2 Delivery and Development

DevOps delivery:
While the delivery model is fully agile, the team is aligned as a DevOps team to manage development, testing and deployments. The pipeline being followed is depicted below:

All the stages of development to deployment are tracked over the pipeline itself.
Central GIT ensures there is absolute transparency in terms of work, defect density, and development quality.

Multiple functional test cases are also built in the pipeline and get triggered when a piece of code is induced, this ensures that the application sanity is maintained, and the piece of code gets tested before the actual deployment in prod. Any violation gets flagged within the pipeline and the cycle repeats.

Reusability and automation of the code and code maintenance hold the key. At every stage of the software development stage (whether its requirement gathering, coding, build, testing, deployment, post deployment testing and application maintenance), automation opportunities are identified and then put into practice.
Key quality gate is peer review which is being followed iteratively. Peer review is being done at both design and development level, so that the deviations could be caught proactively and corrective actions could be taken.

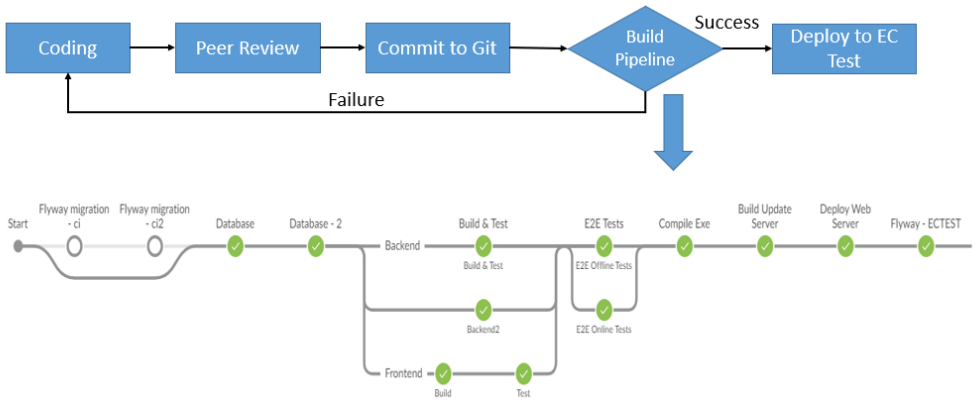

Fig 2.3.2.1 Pipeline Overview

Agile methodology:

One of the core philosophies of Agile methodology is to be close to actual user and environment so that the solutions are aligned with the problem statement and the actual users are there to either accept the change or suggest any tweaking.

Many times, in industry the applications are built but by the time it reaches the actual users either it is said to be deviation too much from the original ask or worst sometimes are not performing as expected. These are all software development blunders and hence its very prudent that the users are always kept in loop and continuous feedback is taken to ensure the project delivery is always true to its set objectives and if any modification or deviation done then that should be at the request of the users.

With above intent in mind, we continuous interacted with user community to capture and understand the requirement without any ambiguity. This helped the design team greatly as they had opportunity to clarify any doubt with real users.

Apart from users its equally important to understand the ecosystem where the solution is to be used and the problem statement could be addressed. Hence the concept of visiting to the actual sites were adopted along with real users of the application so that the nuances could be better understood.

Frequent visits to the field ensure that issues being faced on the ground is fed back to both design and development of this network design and survey tool/application.

Fig 2.3.2.2 Real Equipment at the site

CHAPTER 3
ANALYTICS & CONSIDERATION

3.1 User stats and automation

Application Hits

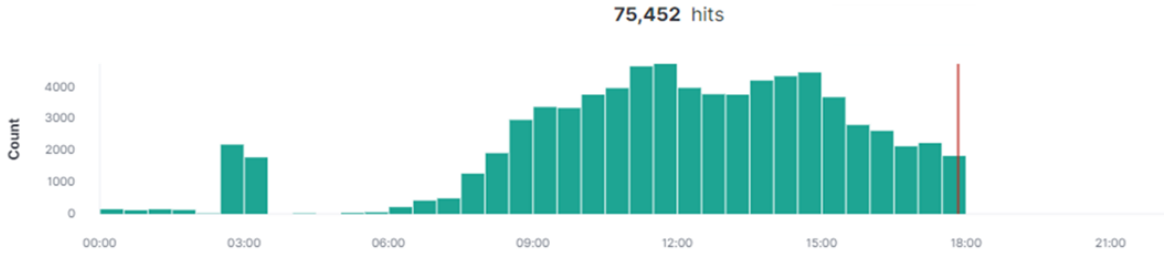

Fig 3.1.1 User Transactions Hits

0.75 million network elements work/edits a week
2.8K distinct WO progression daily
300+ distinct WO/Surveys completions daily
400+ new WO Creation daily
2500+ daily users
11.5k+ total enabled user

Automation:
Multiple traps and alerts have been configured to trap any deviation in the system or usage pattern so that corrective action can be taken. This helps in early detection and system restoration.

Along similar lines, a lot of reports have been automated to capture detailed system health and keep the application team informed on pattern deviation. A lot of analysis has gone into creating different database scripts to fetch these details and similarly on Linux VMs.

Putting below two reports to demonstrate the level of detail, associated metrics, and analysis behind these automated reports.

Application health report:

This is a kind of benchmarking of different parameters which any production report should consider.

From: *********
Sent: 04 December 2022 07:03
To: *********
Cc: *********
Subject: [GREEN] : ORION Live [Site 1 & 2] (Interfacing, Design, Web Edit and Red Side Edit) Servers HC Report at : 04-12-2022 07:03:01

Hi All,

Please find below ORION Live (Interfacing, Design, Web Edit and Red Side Edit) Servers Health Check Report.

ORION MANAGEMENT SUMMARY
THERE IS NO ISSUE ON THIS REPORT

PROCESS STATUS			
PROCESS NAME	**DESCRIPTION**	**IS RUNNING**	**RUNNING SINCE**
CFTMAIN	XFB - *********	RUNNING	22/11/2022 21-55-54 GMT
CFTMAIN	XFB - *********	RUNNING	22/11/2022 21-55-54 GMT
CFTMAIN	XFB - *********	RUNNING	22/11/2022 21-55-54 GMT
CFTMAIN	XFB - *********	RUNNING	22/11/2022 21-55-54 GMT
CFTMAIN	XFB - *********	RUNNING	22/11/2022 21-55-54 GMT
LLAWP	Web Edit Site 2 Apache - *********	RUNNING	29/11/2022 20-07-45 GMT
LLAWP	Web Edit Site 1 Apache - *********	RUNNING	22/11/2022 21-31-26 GMT
LLAWP	Red Side Site 1 Apache - *********	RUNNING	22/11/2022 21-26-55 GMT
LLAWP	Red Side Site 2 Apache - *********	RUNNING	29/11/2022 21-23-55 GMT
Rsync	RSYNC On File Server 1	RUNNING	2022-12-04 07:00 GMT
Rsync	RSYNC On File Server 2	RUNNING	2022-12-04 07:00 GMT
PM2	PCOUNT of Backend.js = 16 on *********	RUNNING	22/11/2022 21-27-01 GMT

PM2	PCOUNT of Backend.js = 16 on **********	RUNNING	22/11/2022 21-27-04 GMT
PM2	PCOUNT of Backend.js = 16 on **********	RUNNING	29/11/2022 20-02-50 GMT
PM2	PCOUNT of Backend.js = 16 on **********	RUNNING	29/11/2022 20-03-06 GMT
PM2	PCOUNT of Backend.js = 16 on **********	RUNNING	22/11/2022 21-12-36 GMT
PM2	PCOUNT of Backend.js = 16 on **********	RUNNING	22/11/2022 21-12-39 GMT
PM2	PCOUNT of Backend.js = 16 on **********	RUNNING	29/11/2022 20-35-12 GMT
PM2	PCOUNT of Backend.js = 16 on **********	RUNNING	29/11/2022 20-37-52 GMT
PM2	PCOUNT of Backend.js = 16 on **********	RUNNING	22/11/2022 22-02-31 GMT
PM2	PCOUNT of Backend.js = 16 on **********	RUNNING	22/11/2022 22-02-34 GMT
PM2	PCOUNT of Backend.js = 16 on **********	RUNNING	29/11/2022 19-50-26 GMT
PM2	PCOUNT of Backend.js = 16 on **********	RUNNING	29/11/2022 19-50-37 GMT

WORK ORDER STATS		
CREATED (SINCE SOD)	**COMPLETED (SINCE SOD)**	**TOTAL USERs ALLOWED**
4	0	12436

DATABASE CONNECTIVITY STATUS	
DB BOX	**PING STATUS**
orion. **********.co.uk	SUCCESSFUL
orion-ext-live. **********.co.uk	SUCCESSFUL
**********.dci.bt.com	SUCCESSFUL
**********.dci.bt.com	SUCCESSFUL
**********-oravip.dci.bt.com	SUCCESSFUL
**********-oravip.dci.bt.com	SUCCESSFUL
**********-scan-oravip.dci.bt.com	SUCCESSFUL
**********.dci.bt.com	SUCCESSFUL
**********.dci.bt.com	SUCCESSFUL
**********-oravip.dci.bt.com	SUCCESSFUL
**********-oravip.dci.bt.com	SUCCESSFUL
**********-scan-oravip.dci.bt.com	SUCCESSFUL

ORION LIVE [SITE 1 & 2] MANAGE SERVER MONITORING

KOTLIN SERVER STATUS MONITORING			
PROCESS NAME	**DESCRIPTION**	**IS RUNNING**	**RUNNING SINCE**
32013	Green Side Site 1 VM1 Kotlin Server 8901 on *********	RUNNING	22/11/2022 21-28-15 GMT
32689	Green Side Site 1 VM1 Kotlin Server 8902 on *********	RUNNING	22/11/2022 21-28-45 GMT
2051	Green Side Site 1 VM1 Kotlin Server 8903 on *********	RUNNING	22/11/2022 21-29-16 GMT
5482	Green Side Site 1 VM2 Kotlin Server 8904 on *********	RUNNING	22/11/2022 21-29-46 GMT
6864	Green Side Site 1 VM2 Kotlin Server 8905 on *********	RUNNING	22/11/2022 21-30-17 GMT
7384	Green Side Site 1 VM2 Kotlin Server 8906 on *********	RUNNING	22/11/2022 21-30-48 GMT
18531	Green Side Site 2 VM1 Kotlin Server 8901 on *********	RUNNING	29/11/2022 20-04-23 GMT
19042	Green Side Site 2 VM1 Kotlin Server 8902 on *********	RUNNING	29/11/2022 20-04-55 GMT
19651	Green Side Site 2 VM1 Kotlin Server 8903 on *********	RUNNING	29/11/2022 20-05-30 GMT
17782	Green Side Site 2 VM2 Kotlin Server 8904 on *********	RUNNING	29/11/2022 20-06-00 GMT
18269	Green Side Site 2 VM2 Kotlin Server 8905 on *********	RUNNING	29/11/2022 20-06-33 GMT
19495	Green Side Site 2 VM2 Kotlin Server 8906 on *********	RUNNING	29/11/2022 20-07-03 GMT
28303	Red Side Site 1 VM1 Kotlin Server 8901 on *********	RUNNING	22/11/2022 21-13-51 GMT
28812	Red Side Site 1 VM1 Kotlin Server 8902 on *********	RUNNING	22/11/2022 21-14-21 GMT
29357	Red Side Site 1 VM1 Kotlin Server 8903 on *********	RUNNING	22/11/2022 21-14-52 GMT
28986	Red Side Site 1 VM2 Kotlin Server 8904 on *********	RUNNING	22/11/2022 21-15-22 GMT
29421	Red Side Site 1 VM2 Kotlin Server 8905 on *********	RUNNING	22/11/2022 21-15-53 GMT
30666	Red Side Site 1 VM2 Kotlin Server 8906 on *********	RUNNING	22/11/2022 21-16-23 GMT
12778	Red Side Site 2 VM1 Kotlin Server 8901 on *********	RUNNING	29/11/2022 20-28-06 GMT

13474	Red Side Site 2 VM1 Kotlin Server 8902 on *********	RUNNING	29/11/2022 20-28-23 GMT
14585	Red Side Site 2 VM1 Kotlin Server 8903 on *********	RUNNING	29/11/2022 20-28-39 GMT
13690	Red Side Site 2 VM2 Kotlin Server 8904 on *********	RUNNING	29/11/2022 20-29-49 GMT
13950	Red Side Site 2 VM2 Kotlin Server 8905 on *********	RUNNING	29/11/2022 20-30-02 GMT
14123	Red Side Site 2 VM2 Kotlin Server 8906 on *********	RUNNING	29/11/2022 20-30-12 GMT

Site 1 Web Interfacing APPLICATION SERVER STATUS					
DOMAIN NAME	**INSTANCE NAME**	**STATE**	**HEALTH**	**JVM PEAK**	**JVM AVERAGE**
oroint01	admin_oroint01	RUNNING	RUNNING	60	43
oroint01	managed1_oroint01	RUNNING	RUNNING	7	5
oroint01	managed2_oroint01	RUNNING	RUNNING	7	5
oroint01	managed3_oroint01	RUNNING	RUNNING	7	4
oroint01	managed4_oroint01	RUNNING	RUNNING	7	5
oroint01	managed5_oroint01	RUNNING	RUNNING	7	5
oroint01	managed6_oroint01	RUNNING	RUNNING	7	5

Site 1 Web Design APPLICATION SERVER STATUS					
DOMAIN NAME	**INSTANCE NAME**	**STATE**	**HEALTH**	**JVM PEAK**	**JVM AVERAGE**
orodes01	admin_orodes01	RUNNING	RUNNING	98	31
orodes01	managed1_orodes01	RUNNING	RUNNING	39	18
orodes01	managed2_orodes01	RUNNING	RUNNING	39	16
orodes01	managed3_orodes01	RUNNING	RUNNING	38	20
orodes01	managed4_orodes01	RUNNING	RUNNING	39	14

Site 1 Web Edit APPLICATION SERVER STATUS					
DOMAIN NAME	**INSTANCE NAME**	**STATE**	**HEALTH**	**JVM PEAK**	**JVM AVERAGE**
oroedit01	admin_oroedit01	RUNNING	RUNNING	45	45
oroedit01	managed1_oroedit01	RUNNING	RUNNING	7	7
oroedit01	managed2_oroedit01	RUNNING	RUNNING	9	9
oroedit01	managed3_oroedit01	RUNNING	RUNNING	7	7
oroedit01	managed4_oroedit01	RUNNING	RUNNING	7	7
oroedit01	managed5_oroedit01	RUNNING	RUNNING	37	37
oroedit01	managed6_oroedit01	RUNNING	RUNNING	8	8

Site 1 Red Side Edit APPLICATION SERVER STATUS					
DOMAIN NAME	**INSTANCE NAME**	**STATE**	**HEALTH**	**JVM PEAK**	**JVM AVERAGE**
ororedit01	admin_ororedit01	RUNNING	RUNNING	77	20
ororedit01	managed1_ororedit01	RUNNING	RUNNING	86	41

ororedit01	managed2_ororedit01	RUNNING	RUNNING	100	29
ororedit01	managed3_ororedit01	RUNNING	RUNNING	100	26
ororedit01	managed4_ororedit01	RUNNING	RUNNING	100	15
ororedit01	managed5_ororedit01	RUNNING	RUNNING	86	18
ororedit01	managed6_ororedit01	RUNNING	RUNNING	86	24

Site 2 Web Interfacing APPLICATION SERVER STATUS					
DOMAIN NAME	**INSTANCE NAME**	**STATE**	**HEALTH**	**JVM PEAK**	**JVM AVERAGE**
oroint02	admin_oroint02	RUNNING	RUNNING	96	36
oroint02	managed1_oroint02	RUNNING	RUNNING	9	4
oroint02	managed2_oroint02	RUNNING	RUNNING	9	5
oroint02	managed3_oroint02	RUNNING	RUNNING	9	4
oroint02	managed4_oroint02	RUNNING	RUNNING	8	4
oroint02	managed5_oroint02	RUNNING	RUNNING	9	5
oroint02	managed6_oroint02	RUNNING	RUNNING	8	4

Site 2 Web Design APPLICATION SERVER STATUS					
DOMAIN NAME	**INSTANCE NAME**	**STATE**	**HEALTH**	**JVM PEAK**	**JVM AVERAGE**
orodes02	admin_orodes02	RUNNING	RUNNING	97	35
orodes02	managed1_orodes02	RUNNING	RUNNING	49	16
orodes02	managed2_orodes02	RUNNING	RUNNING	44	16
orodes02	managed3_orodes02	RUNNING	RUNNING	55	14
orodes02	managed4_orodes02	RUNNING	RUNNING	54	16

Site 2 Web Edit APPLICATION SERVER STATUS					
DOMAIN NAME	**INSTANCE NAME**	**STATE**	**HEALTH**	**JVM PEAK**	**JVM AVERAGE**
oroedit02	admin_oroedit02	RUNNING	RUNNING	83	37
oroedit02	managed1_oroedit02	RUNNING	RUNNING	86	51
oroedit02	managed2_oroedit02	RUNNING	RUNNING	86	29
oroedit02	managed3_oroedit02	RUNNING	RUNNING	98	13
oroedit02	managed4_oroedit02	RUNNING	RUNNING	92	37
oroedit02	managed5_oroedit02	RUNNING	RUNNING	90	21
oroedit02	managed6_oroedit02	RUNNING	RUNNING	88	52

Site 2 Red Side Edit APPLICATION SERVER STATUS					
DOMAIN NAME	**INSTANCE NAME**	**STATE**	**HEALTH**	**JVM PEAK**	**JVM AVERAGE**
ororedit02	admin_ororedit02	RUNNING	RUNNING	78	31
ororedit02	managed1_ororedit02	RUNNING	RUNNING	89	44
ororedit02	managed2_ororedit02	RUNNING	RUNNING	86	7
ororedit02	managed3_ororedit02	RUNNING	RUNNING	86	40
ororedit02	managed4_ororedit02	RUNNING	RUNNING	100	24
ororedit02	managed5_ororedit02	RUNNING	RUNNING	95	9

oroedit02	managed6_oroedit02	RUNNING	RUNNING	86	26

Site 1 Web Interfacing Server MEMORY UTILIZATION (in MB)				
SERVER NAME	**CURRENT MEMORY**	**FREE MEMORY**	**MAX MEMORY**	**FREE MEMORY (%)**
admin_oroint01	973	382	973	39
managed1_oroint01	2022	1714	6092	94
managed2_oroint01	2022	1820	6092	96
managed3_oroint01	2022	1676	6092	94
managed4_oroint01	2022	1680	6092	94
managed5_oroint01	2022	1785	6092	96
managed6_oroint01	2022	1776	6092	95

Site 1 Web Design SERVER MEMORY UTILIZATION (in MB)				
SERVER NAME	**CURRENT MEMORY**	**FREE MEMORY**	**MAX MEMORY**	**FREE MEMORY (%)**
admin_orodes01	998	698	998	69
managed1_orodes01	1996	1768	1996	88
managed2_orodes01	1996	1761	1996	88
managed3_orodes01	1996	1754	1996	87
managed4_orodes01	1996	1525	1996	76

Site 1 Web Edit SERVER MEMORY UTILIZATION (in MB)				
SERVER NAME	**CURRENT MEMORY**	**FREE MEMORY**	**MAX MEMORY**	**FREE MEMORY (%)**
admin_oroedit01	998	527	998	52
managed1_oroedit01	2022	1617	6092	93
managed2_oroedit01	2022	1522	6092	91
managed3_oroedit01	2022	1618	6092	93
managed4_oroedit01	2022	1606	6092	93
managed5_oroedit01	5438	3178	6092	62
managed6_oroedit01	2022	1562	6092	92

Site 1 Red Side Edit SERVER MEMORY UTILIZATION (in MB)				
SERVER NAME	**CURRENT MEMORY**	**FREE MEMORY**	**MAX MEMORY**	**FREE MEMORY (%)**
admin_ororedit01	998	517	998	51
managed1_ororedit01	2022	1494	4044	86
managed2_ororedit01	2022	1620	4044	90
managed3_ororedit01	2022	1489	4044	86
managed4_ororedit01	2022	1555	4044	88
managed5_ororedit01	2022	1646	4044	90
managed6_ororedit01	2022	1529	4044	87

Site 2 Web Interfacing Server MEMORY UTILIZATION (in MB)				
SERVER NAME	CURRENT MEMORY	FREE MEMORY	MAX MEMORY	FREE MEMORY (%)
admin_oroint02	998	662	998	66
managed1_oroint02	2022	1767	6092	95
managed2_oroint02	2022	1727	6092	95
managed3_oroint02	2022	1831	6092	96
managed4_oroint02	2022	1820	6092	96
managed5_oroint02	2022	1690	6092	94
managed6_oroint02	2022	1844	6092	97

Site 2 Web Design SERVER MEMORY UTILIZATION (in MB)				
SERVER NAME	CURRENT MEMORY	FREE MEMORY	MAX MEMORY	FREE MEMORY (%)
admin_orodes02	998	560	998	56
managed1_orodes02	1996	1764	1996	88
managed2_orodes02	1996	1853	1996	92
managed3_orodes02	1996	1464	1996	73
managed4_orodes02	1996	1551	1996	77

Site 2 Web Edit SERVER MEMORY UTILIZATION (in MB)				
SERVER NAME	CURRENT MEMORY	FREE MEMORY	MAX MEMORY	FREE MEMORY (%)
admin_oroedit02	998	627	998	62
managed1_oroedit02	2022	1594	6092	92
managed2_oroedit02	2022	1635	6092	93
managed3_oroedit02	2022	1631	6092	93
managed4_oroedit02	2022	1700	6092	94
managed5_oroedit02	2022	1556	6092	92
managed6_oroedit02	2022	1659	6092	94

Site 2 Red Side Edit SERVER MEMORY UTILIZATION (in MB)				
SERVER NAME	CURRENT MEMORY	FREE MEMORY	MAX MEMORY	FREE MEMORY (%)
admin_ororedit02	998	585	998	58
managed1_ororedit02	2022	1685	4044	91
managed2_ororedit02	2022	1616	4044	89
managed3_ororedit02	2022	1607	4044	89
managed4_ororedit02	2022	1705	4044	92
managed5_ororedit02	2022	1638	4044	90
managed6_ororedit02	2022	1546	4044	88

MOUNT POINTS OF ALL HOSTS

SERVER	MOUNT POINT	TOTAL SIZE	USAGE	AVAIL	USAGE(%)
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********	HEALTHY	HEALTHY	HEALTHY	HEALTHY	HEALTHY
*********File Server 1	/file_photographs_prod	3.0T	1.4T	1.7T	45
*********File Server 2	/file_photographs_prod	3.0T	1.4T	1.7T	45

CPU UTILIZATION STATUS OF ALL HOSTS	
SERVER	USAGE(%)
Site 1 Interface 1 (*********)	7.87
Site 1 Interface 2 (*********)	1.16
Site 2 Interface 1 (*********)	2.07
Site 2 Interface 2 (*********)	1.25
Site 1 Web Edit 1 (*********)	1.66
Site 1 Web Edit 2 (*********)	1.08
Site 2 Web Edit 1 (*********)	2.08
Site 2 Web Edit 2 (*********)	1.71
Site 1 Red Side Edit 1 (*********)	1.60
Site 1 Red Side Edit 2 (*********)	1.24
Site 2 Red Side Edit 1 (*********)	2.23
Site 2 Red Side Edit 2 (*********)	1.54
Site 1 Web Design 1 (*********)	2.55
Site 1 Web Design 2 (*********)	1.25
Site 2 Web Design 1 (*********)	3.14
Site 2 Web Design 2 (*********)	1.88

MEMORY UTILIZATION STATUS OF ALL HOSTS							
SERVER	TOTAL MEMORY(MB)	USED MEMORY(MB)	MEMORY USED(%)	SWAP USED(MB)	SWAP TOTAL(MB)	BUFFER MEMORY	AVAILABLE MEMORY
*********	32010	20531	64	2242	5115	6747	11042
*********	32010	16071	50	898	5115	14994	15524
*********	15884	9065	57	41	5115	5871	6449
*********	15884	7254	45	14	5115	8399	8265
*********	64264	25992	40	75	17403	35723	37702
*********	64264	26674	41	26	17403	35346	37036
*********	64264	25660	39	32	17403	36233	38033
*********	64264	22657	35	4	17403	39959	41041
*********	32010	17827	55	937	5115	13095	13095
*********	32010	16210	50	44	5115	14100	14100
*********	15884	9077	57	19	5115	5834	6432
*********	15884	7242	45	7	5115	8408	8270
*********	64264	23620	36	7	17403	38420	40064
*********	64264	21034	32	4	17403	41781	42663
*********	64264	24360	37	19	17403	37595	39332
*********	64264	22444	34	4	17403	40317	41254

Site 1 Web Interfacing Server THREAD STATISTICS					
DOMAIN NAME	INSTANCE NAME	THREAD NAME	MAX THREAD	RUNNING THREAD	HOGGING
oroint01	admin_oroint01	Self-Tuning Thread Pool	21	7	0

oroint01	managed1_oroint01	Self-Tuning Thread Pool	22	4	0
oroint01	managed2_oroint01	Self-Tuning Thread Pool	11	5	0
oroint01	managed3_oroint01	Self-Tuning Thread Pool	22	4	0
oroint01	managed4_oroint01	Self-Tuning Thread Pool	9	4	0
oroint01	managed5_oroint01	Self-Tuning Thread Pool	22	3	0
oroint01	managed6_oroint01	Self-Tuning Thread Pool	9	3	0

Site 1 Web Design Server THREAD STATISTICS					
DOMAIN NAME	**INSTANCE NAME**	**THREAD NAME**	**MAX THREAD**	**RUNNING THREAD**	**HOGGING**
orodes01	admin_orodes01	Self-Tuning Thread Pool	22	5	0
orodes01	managed1_orodes01	Self-Tuning Thread Pool	13	6	1
orodes01	managed2_orodes01	Self-Tuning Thread Pool	21	4	0
orodes01	managed3_orodes01	Self-Tuning Thread Pool	9	4	1
orodes01	managed4_orodes01	Self-Tuning Thread Pool	15	3	1

Site 1 Web Edit Server THREAD STATISTICS					
DOMAIN NAME	**INSTANCE NAME**	**THREAD NAME**	**MAX THREAD**	**RUNNING THREAD**	**HOGGING**
oroedit01	admin_oroedit01	Self-Tuning Thread Pool	21	7	0
oroedit01	managed1_oroedit01	Self-Tuning Thread Pool	23	4	1
oroedit01	managed2_oroedit01	Self-Tuning Thread Pool	22	3	1
oroedit01	managed3_oroedit01	Self-Tuning Thread Pool	22	4	1
oroedit01	managed4_oroedit01	Self-Tuning Thread Pool	24	10	1
oroedit01	managed5_oroedit01	Self-Tuning Thread Pool	25	17	1
oroedit01	managed6_oroedit01	Self-Tuning Thread Pool	26	22	1

Site 1 Red Side Edit Server THREAD STATISTICS					
DOMAIN NAME	**INSTANCE NAME**	**THREAD NAME**	**MAX THREAD**	**RUNNING THREAD**	**HOGGING**

ororedit01	admin_ororedit01	Self-Tuning Thread Pool	22	10	0
ororedit01	managed1_ororedit01	Self-Tuning Thread Pool	18	4	1
ororedit01	managed2_ororedit01	Self-Tuning Thread Pool	22	4	1
ororedit01	managed3_ororedit01	Self-Tuning Thread Pool	22	4	1
ororedit01	managed4_ororedit01	Self-Tuning Thread Pool	23	4	1
ororedit01	managed5_ororedit01	Self-Tuning Thread Pool	23	4	0
ororedit01	managed6_ororedit01	Self-Tuning Thread Pool	23	4	0

Site 2 Web Interfacing Server THREAD STATISTICS					
DOMAIN NAME	**INSTANCE NAME**	**THREAD NAME**	**MAX THREAD**	**RUNNING THREAD**	**HOGGING**
oroint02	admin_oroint02	Self-Tuning Thread Pool	25	11	0
oroint02	managed1_oroint02	Self-Tuning Thread Pool	9	3	0
oroint02	managed2_oroint02	Self-Tuning Thread Pool	9	3	0
oroint02	managed3_oroint02	Self-Tuning Thread Pool	17	3	0
oroint02	managed4_oroint02	Self-Tuning Thread Pool	18	4	0
oroint02	managed5_oroint02	Self-Tuning Thread Pool	18	4	1
oroint02	managed6_oroint02	Self-Tuning Thread Pool	23	3	1

Site 2 Web Design Server THREAD STATISTICS					
DOMAIN NAME	**INSTANCE NAME**	**THREAD NAME**	**MAX THREAD**	**RUNNING THREAD**	**HOGGING**
orodes02	admin_orodes02	Self-Tuning Thread Pool	16	11	0
orodes02	managed1_orodes02	Self-Tuning Thread Pool	19	3	0
orodes02	managed2_orodes02	Self-Tuning Thread Pool	16	4	0
orodes02	managed3_orodes02	Self-Tuning Thread Pool	19	3	0
orodes02	managed4_orodes02	Self-Tuning Thread Pool	23	3	0

Site 2 Web Edit Server THREAD STATISTICS

DOMAIN NAME	INSTANCE NAME	THREAD NAME	MAX THREAD	RUNNING THREAD	HOGGING
oroedit02	admin_oroedit02	Self-Tuning Thread Pool	22	6	0
oroedit02	managed1_oroedit02	Self-Tuning Thread Pool	22	3	1
oroedit02	managed2_oroedit02	Self-Tuning Thread Pool	15	6	1
oroedit02	managed3_oroedit02	Self-Tuning Thread Pool	24	3	1
oroedit02	managed4_oroedit02	Self-Tuning Thread Pool	24	4	1
oroedit02	managed5_oroedit02	Self-Tuning Thread Pool	24	22	1
oroedit02	managed6_oroedit02	Self-Tuning Thread Pool	24	4	1

Site 2 Red Side Edit Server THREAD STATISTICS					
DOMAIN NAME	INSTANCE NAME	THREAD NAME	MAX THREAD	RUNNING THREAD	HOGGING
ororedit02	admin_ororedit02	Self-Tuning Thread Pool	15	12	0
ororedit02	managed1_ororedit02	Self-Tuning Thread Pool	23	3	1
ororedit02	managed2_ororedit02	Self-Tuning Thread Pool	23	3	0
ororedit02	managed3_ororedit02	Self-Tuning Thread Pool	23	3	1
ororedit02	managed4_ororedit02	Self-Tuning Thread Pool	23	4	1
ororedit02	managed5_ororedit02	Self-Tuning Thread Pool	23	4	1
ororedit02	managed6_ororedit02	Self-Tuning Thread Pool	23	4	1

READ/WRITES OF [Site 1 & 2] WEB (Interfacing, Design and Edit) SERVERS					
Read/Writes on ********* (*********)					
Device	Transfers/Sec	Block Reads/Sec	Block Writes/Sec	Total Block Reads	Total Block Writes
sda	9.13	14.83	117.44	14640221	115947040
sdc	2.40	126.63	72.70	125022626	71774361
sdb	0.00	0.05	0.08	46592	75460
dm-0	0.47	7.58	2.46	7483367	2426298
dm-1	0.02	0.01	0.08	10260	75460
dm-10	0.02	1.11	0.04	1096927	42356
dm-11	7.86	2.24	106.31	2214851	104958436

dm-12	0.63	1.36	4.52	1343438	4463612
dm-13	0.00	0.01	0.00	5386	2156
dm-14	0.55	2.12	4.10	2093918	4050022
dm-2	0.35	2.41	7.89	2378631	7790084
dm-3	0.00	0.01	0.00	7236	2168
dm-4	0.00	1.44	0.00	1417430	2240
dm-5	0.02	2.48	0.04	2452432	42895
dm-6	0.06	6.36	0.11	6279344	103668
dm-7	1.30	35.50	64.50	35045150	63677813
dm-8	2.11	362.85	9.25	358231931	9131893

Read/Writes on ********* (*********)					
Device	**Transfers/Sec**	**Block Reads/Sec**	**Block Writes/Sec**	**Total Block Reads**	**Total Block Writes**
sda	9.44	8.83	117.80	8721287	116288854
sdc	1.78	49.36	9.61	48730227	9485801
sdb	0.00	0.04	0.02	41572	23584
dm-0	0.40	5.12	2.56	5053515	2522682
dm-1	0.01	0.01	0.02	5368	23584
dm-10	0.02	1.46	0.05	1440156	51885
dm-11	0.04	3.58	0.13	3536201	127715
dm-12	0.93	18.89	4.06	18649574	4005225
dm-13	1.49	162.19	8.55	160116040	8442266
dm-14	0.32	48.61	1.66	47991286	1641433
dm-2	0.31	1.23	8.96	1216310	8845414
dm-3	0.01	0.05	0.03	50607	29077
dm-4	8.28	1.44	106.76	1424078	105389591
dm-5	0.00	0.01	0.00	7235	2168
dm-6	0.62	0.83	4.36	816238	4308893
dm-7	0.00	0.01	0.00	7237	2168
dm-8	0.00	0.01	0.00	5364	2156

Read/Writes on ********* (*********)					
Device	**Transfers/Sec**	**Block Reads/Sec**	**Block Writes/Sec**	**Total Block Reads**	**Total Block Writes**
sda	9.60	23.41	121.12	9030228	46718471
sdc	3.29	171.13	69.68	66007024	26875609
sdb	0.00	0.05	0.04	19628	16868
dm-0	0.61	13.12	2.25	5060791	868501
dm-1	0.01	0.01	0.04	4744	16868
dm-10	0.37	46.98	2.96	18120748	1140118
dm-11	8.23	3.89	110.28	1499555	42537127
dm-12	0.66	2.26	4.57	872342	1763317
dm-13	0.01	0.01	0.01	5371	2096

dm-14	0.52	3.50	3.96	1351218	1528064
dm-2	0.40	3.52	7.93	1359039	3057054
dm-3	0.00	0.02	0.01	7235	2096
dm-4	0.00	1.42	0.01	549170	2108
dm-5	0.04	3.74	0.04	1441964	14478
dm-6	0.08	9.13	0.09	3521088	34916
dm-7	1.53	52.57	59.98	20275263	23135702
dm-8	0.02	0.06	0.04	24933	16635

Read/Writes on ********* (*********)					
Device	**Transfers/Sec**	**Block Reads/Sec**	**Block Writes/Sec**	**Total Block Reads**	**Total Block Writes**
sda	9.01	20.92	105.17	8068524	40554486
sdc	2.40	133.56	10.15	51500258	3914337
sdb	0.00	0.05	0.00	18016	1336
dm-0	0.61	12.04	2.44	4644359	939560
dm-1	0.00	0.01	0.00	3264	1336
dm-10	0.02	0.06	0.03	23261	10904
dm-11	7.51	3.37	94.13	1301350	36294993
dm-12	0.67	2.14	4.54	824331	1752046
dm-13	0.01	0.01	0.01	4408	2096
dm-14	0.56	2.74	4.02	1056110	1551956
dm-2	0.00	0.02	0.01	6200	2096
dm-3	0.00	0.02	0.01	6202	2096
dm-4	0.04	4.22	0.05	1625596	19661
dm-5	0.08	9.04	0.11	3486456	43576
dm-6	1.27	45.86	4.23	17682754	1629947
dm-7	2.21	465.19	8.77	179374702	3382667
dm-8	0.25	1.42	1.67	549322	644125

Read/Writes on ********* (*********)					
Device	**Transfers/Sec**	**Block Reads/Sec**	**Block Writes/Sec**	**Total Block Reads**	**Total Block Writes**
sda	9.89	12.57	109.82	12414580	108422340
sdc	2.54	103.06	60.33	101752517	59559549
sdb	0.00	0.04	0.03	40872	30316
dm-0	0.44	6.10	2.73	6021387	2693260
dm-1	0.01	0.00	0.03	4736	30316
dm-10	0.02	0.45	0.06	442463	55132
dm-11	8.73	2.29	99.10	2260551	97843631
dm-12	0.61	1.25	4.47	1231590	4415738
dm-13	0.00	0.00	0.00	4361	2156
dm-14	0.45	2.07	3.45	2041330	3407575
dm-2	0.34	2.28	10.02	2250379	9896046

dm-3	0.00	0.01	0.00	6199	2180
dm-4	0.02	1.81	0.05	1791216	52767
dm-5	0.04	4.87	0.13	4803556	131571
dm-6	0.00	0.01	0.00	6202	2180
dm-7	1.39	32.32	52.54	31911126	51873194
dm-8	2.05	261.61	9.75	258283062	9622173

Read/Writes on ********* (*********)					
Device	**Transfers/Sec**	**Block Reads/Sec**	**Block Writes/Sec**	**Total Block Reads**	**Total Block Writes**
sda	9.53	7.19	107.66	7100063	106281069
sdc	1.77	28.74	11.58	28370746	11427291
sdb	0.00	0.04	0.00	39420	1604
dm-0	0.34	3.86	2.44	3813326	2412476
dm-1	0.00	0.00	0.00	3292	1604
dm-10	0.01	0.02	0.03	23781	24871
dm-11	8.44	1.17	96.69	1157308	95454116
dm-12	0.61	0.78	4.37	767498	4316417
dm-13	0.00	0.00	0.00	4329	2156
dm-14	0.55	1.07	4.12	1055111	4066860
dm-2	0.30	1.18	8.78	1167410	8666961
dm-3	0.00	0.01	0.00	6199	2180
dm-4	0.01	1.16	0.04	1140316	42442
dm-5	0.03	2.75	0.11	2719088	105131
dm-6	0.00	0.01	0.00	6202	2180
dm-7	1.00	16.93	4.87	16717274	4808364
dm-8	1.33	108.49	8.56	107104505	8455275

Read/Writes on ********* (*********)					
Device	**Transfers/Sec**	**Block Reads/Sec**	**Block Writes/Sec**	**Total Block Reads**	**Total Block Writes**
sda	10.96	22.49	111.81	8632172	42919819
sdc	2.90	99.22	72.71	38086195	27908288
sdb	0.00	0.05	0.02	18536	6048
dm-0	0.51	10.58	2.32	4062479	889721
dm-1	0.00	0.01	0.02	3764	6048
dm-10	0.00	0.02	0.01	6690	2096
dm-11	1.68	53.12	64.53	20391658	24769074
dm-12	2.41	413.94	11.13	158888584	4273290
dm-13	0.28	12.08	2.05	4636897	785160
dm-14	0.44	4.08	8.59	1567426	3297943
dm-2	0.02	0.06	0.04	24845	16083
dm-3	9.64	5.89	100.78	2261107	38684185
dm-4	0.66	2.15	4.64	826694	1779977

dm-5	0.01	0.01	0.01	4395	2084
dm-6	0.53	3.30	4.03	1268546	1545005
dm-7	0.00	0.02	0.01	6199	2096
dm-8	0.04	4.19	0.04	1607627	15019

Read/Writes on ********* (*********)					
Device	**Transfers/Sec**	**Block Reads/Sec**	**Block Writes/Sec**	**Total Block Reads**	**Total Block Writes**
sda	9.24	21.37	105.53	8201792	40499584
sdc	2.40	99.50	10.91	38185258	4186664
sdb	0.00	0.05	0.01	18484	2116
dm-0	0.64	11.80	2.93	4527518	1124078
dm-1	0.00	0.01	0.01	3732	2116
dm-10	7.81	3.72	94.07	1427347	36101114
dm-11	0.68	2.08	4.70	797895	1802839
dm-12	0.01	0.01	0.01	4408	2096
dm-13	0.47	3.22	3.77	1236898	1448268
dm-14	0.36	3.30	9.64	1265543	3698909
dm-2	0.00	0.02	0.01	6200	2096
dm-3	0.05	4.23	0.08	1621860	31090
dm-4	0.09	9.04	0.19	3467672	72217
dm-5	0.00	0.02	0.01	6202	2096
dm-6	1.50	46.19	5.60	17726870	2147860
dm-7	2.03	404.80	8.17	155353300	3134195
dm-8	0.27	26.33	1.53	10103626	585420

Thanks & regards,
ORION ASG

Please note

- Each category may have different RED/AMBER thresholds based on various conditions.

Note: All mail ids and server details have been masked for data security and compliance reasons

Database health report:

From: **********
Sent: 04 December 2022 09:03
To: **********
Subject: RED | ORION 12C PROD DB Health Report | 09:03

Hi All

DATABASE HEALTH CHECK REPORT - ORION 12C PROD DB @09:03

DB INSTANCE STATUS

INSTANCE NAME	HOST NAME	DB VERSION	DATABASE STATUS	DB UP TIME	DB UP DAYS
orip2e1	*********	12.1.0.2.0	ACTIVE	10-NOV-22	24
orip2e2	*********	12.1.0.2.0	ACTIVE	10-NOV-22	24

Message:: All ORION DB nodes are up and running

DB CONNECTION COUNT INSTANCE/SCHEMA WISE

INSTANCE_NAME	ORION	APPPERF	TOTAL
orip2e1	19	5	24
orip2e2	15	6	21

Typical connections count for each DB instance should be around 250-400.

A total difference of 10-20 percent session count across nodes is acceptable for this database.

BLOCKING QUERY

NO BLOCKING QUERY

INVALID OBJECT LIST

NO INVALID OBJECTS

DB TOTAL DATABASE USAGE

Data Gb	Temp Gb	Redo Gb	Total Gb
3939.92	32	18.75	3990.67

DB PHYSICAL/ACTUAL SIZE

DB PHYSICAL SIZE (GB)	3939.92
DB ACUTAL SIZE (GB)	3722.22

HOST CPU CURRENT UTILIZATION PERCENTAGE

INST_ID	METRIC_NAME	CURRENT_VALUE
1	Host CPU Utilization (Percentage)	32.19
2	Host CPU Utilization (Percentage)	25.78

DISKGROUP USED / FREE SPACE

NAME	Diskgroup Free(GB)	Diskgroup Total(GB)	Diskgroup Used Percentage
DATA_DG01	2949.63	6999.99	57.86
ARCH_DG01	727.34	960	24.24

TABLESPACE USED / FREE SPACE

TABLESPACE_NAME	TOTAL ALLOC (GB)	TOTAL PHYS ALLOC (GB)	USED (GB)	Percentage Used	Percentage Free
ORION	4486.19	3847.19	3655.86	81.49	18.51
ORION_EXPORT	60	41	38.93	64.89	35.11
USERS	32	17.39	16.12	50.39	49.61
DDLAUDITING	.02	.02	.01	44.25	55.75
AUDIT_DATA	4.88	1.46	1.18	24.26	75.74
LOAD_TEST	32	6.15	5.85	18.27	81.73
MONITORING_TB_SPACE	32	2.93	2.71	8.46	91.54
SYSAUX	32	2.49	1.23	3.86	96.14
SYSTEM	32	.45	.33	1.04	98.96
STAGING	32	18.07	0	0	100
ORION_HAAS_PROD	32	.2	0	0	100
ORION_DATA	32	.22	0	0	100
NETDESIGN_TS	32	1.56	0	0	100
ORION_EXT_DATA	32	.78	0	0	100

TABLESPACE AVERAGE INCREASE PER DAY

TABLESPACE_NAME	CURR_USED_SIZE_GB	AVG_INCREASE_GB
ORION	3658.8	-.11

TABLESPACE GROWTH

DAYS	TSNAME	CUR_SIZE_GB	USED_SIZE_GB	PREV_USED_SIZE_GB	GROWTH
27-NOV-22	ORION	3847.19	3656.64	3656.64	0
28-NOV-22	ORION	3847.19	3656.64	3656.64	0
29-NOV-22	ORION	3847.19	3658.71	3656.64	2.07
30-NOV-22	ORION	3847.19	3658.71	3658.71	0
01-DEC-22	ORION	3847.19	3658.8	3658.71	.09
02-DEC-22	ORION	3847.19	3658.8	3658.8	0
03-DEC-22	ORION	3847.19	3638.98	3658.8	-19.82
04-DEC-22	ORION	3847.19	3655.85	3638.98	16.87

DB WAIT TIME

EVENT_NAME	TOTAL_TIME
gc current block busy	466.89
db file sequential read	457.04
db file parallel write	379.98
log file parallel write	307.82
gcs log flush sync	304.89

TEMP SESSIONS

TEMP_SESSIONS
2

SEQUENCE NEARLY REACHED(90 percent)ITS MAX VALUE

NO SEQUENCE REACHING ITS MAX VALUE

Note : This is an Automated Report.

Regards,

ORION ASG

Note: All mail ids and server details have been masked for data security and compliance reasons

3.2 Re-Platforming consideration

The metric analysis is done by analyzing CPU, memory, and other computing requirements to decide on the new infra requirements and specifications.
GoldenGate has been considered against the current Active data guard to ensure high availability and lesser restoration time in case of an eventuality.

Similar SiteMinder is to be replaced by Microsoft Azure Active Directory for user authentication.
OEL 7 to OEL8 Kit being procured so that from OS perspective its much more resilient and less exposed to vulnerabilities.

CHAPTER 4
CONCLUSION

4.1 Benefits

Cultural transformations and Benefits realized in DevOps Model following Agile methodology:

- Completely Transformed manual paper-based network plan and design to digital survey
- Fully automated manual network planning to digital network blueprint for UK
- Cultural transformation of Surveyors to mobile planners
- Agile and Devops adoption for quicker delivery. This needed much more focus on aligning the developer and business mindset as per the project need
- Onboarded partners to perform mobile planning using Orion application to expedite the network build
- CI / CD and Automated Functional Testing done for the project
- Enabling a new partner business model helping our partners to work more effectively on behalf of Company
- Efficiency through digitisation and mobile planning reduced the dwell time by around 60%

4.2 Roadmap

Within the 3rd Sem timeline, a lot of application enhancements were done. The application went through various service improvements and automation in terms of overall application alerts, traps and automated reports.

In the 4th Sem roadmap the focus of work was on applications' resilience and continuity.
In order to achieve these goals application has to go for a re-platforming in terms of infrastructure to make the application more resilient, cloud authentication and higher application availability.

Sub-Goals:

- Continued overall technical delivery management for the program
- Continued stakeholders and user interactions to bring the best digital engineering/user experience
- Application onto new infra with latest OS (OEL 8)
- Application to be cross data centres and in high availability mode with continued app as active-active
- High availability using GoldenGate replication at the database level
- Enabling data availability onto GCP for business insights and reporting
- Common document management capability using Cloud technology – Transflex – AWS Cloud
- To manage the delivery of an enhanced set of new demands/functionalities to drive faster fibre rollout

4.3 Project plan adherence and status

The project followed agile methodologies and as a team managed to work together to achieve the broader goals laid down. Project faced hiccups around cloud authentication implementation and the parameters across component and the Microsoft Azure cloud platform. However, by enhancing the log levels it was found that one of the components with application was not picking the authentication parameters correctly and hence was throwing up error when transactions were initiated from browser.

Post exhaustive level of component level testing followed by end to end and regression the functionalities were deployed, and post deployment testing were organized. Based on quality gates sign offs application was made available to users.

In current state the application is now working out of new platform, though as a mitigation strategy the previous infra is also in running state, so that in case of any major and unavoidable incidence users could be directed to this infra.
Dissertation scope has been completed and the project is progressing business as usual.

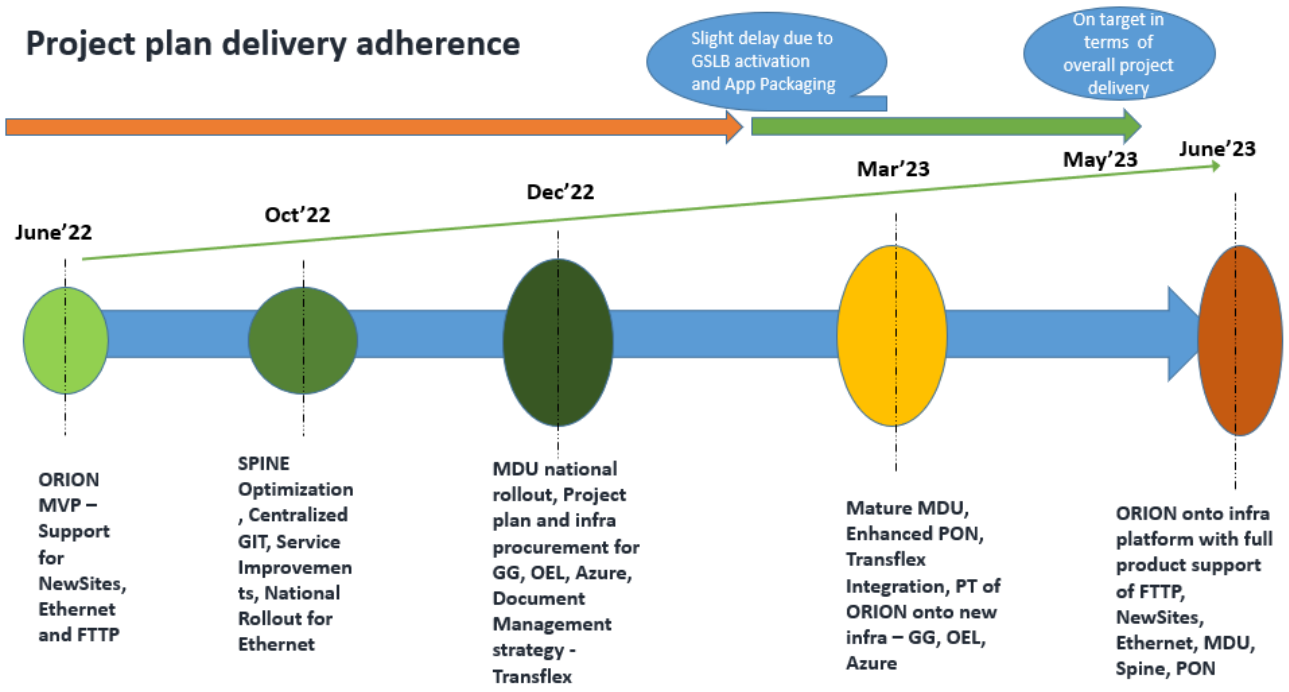

Fig 4.3.1 Project plan and adherence

REFERENCES

WHITE PAPERS:

- **HTTPS://TELECOMS.COM/INTELLIGENCE/HOW-TELCOS-CAN-CREATE-VALUE-WITH-MULTI-FACETED-AUTOMATION/**
- **HTTPS://TELECOMS.COM/WP-CONTENT/BLOGS.DIR/1/FILES/2021/05/TELECOMS.COM-INTELLIGENCE-SUBTONOMY-WHITEPAPER-FINAL.PDF**
  AUTOMATION, SELF SERVE IMPACT FOR L1 (ORION HAD CLOSE TO 50% REDUCTION IN CONTACT)
- **HTTPS://TELECOMS.COM/WP-CONTENT/BLOGS.DIR/1/FILES/2018/03/DNS_ENCRYPTION_WP_LIGHT.PDF**
  LEARNING WAYS AND MEANS TO REDUCE VULNERABILITIES AND CYBER THREATS USING CHANGING DNS FOR INDUCING MALICIOUS SOFTWARE
- **HTTPS://WWW.FNTSOFTWARE.COM/EN/INDUSTRY/TELECOMMUNICATIONS/WHITE-PAPER-BEST-PRACTICES-IN-TELECOM-INFRASTRUCTURE-MANAGEMENT**
  BEST PRACTICE IN TELECOM INFRA MANAGEMENT , INVENTORY TOOLS, RELEVANCE OF UPDATED SOFTWARE VERSIONS AND TOOLS, CENTRAL SYSTEM, AUTOMATION, REAL-TIME INVENTORY

OTHER REFERENCES

- **HTTPS://WWW.OFCOM.ORG.UK/RESEARCH-AND-DATA/TELECOMS-RESEARCH/BROADBAND-RESEARCH/ECONOMIC-IMPACT-BROADBAND**
- **HTTPS://WWW.OFCOM.ORG.UK/__DATA/ASSETS/PDF_FILE/0025/113299/ECONOMIC-BROADBAND-OECD-COUNTRIES.PDF**
- **HTTPS://ORACLEDBWR.COM/ORACLE-GOLDENGATE-VS-ORACLE-DATA-GUARD/**
- **HTTPS://WWW.DOI.GOV/OCIO/CUSTOMERS/WHAT-ADFS-DOES**
- **HTTPS://WWW.CISCO.COM/C/EN_IN/PRODUCTS/SECURITY/COMMON-CYBERATTACKS.HTML**

APPENDIX

Appendix A: Automated application health report

RE_ _GREEN_ _
ORION Live _Site 1 &

Note: All mail ids and server details have been masked for data security and compliance reasons

Appendix B: Automated database health report

Note: All mail ids and server details have been masked for data security and compliance reasons

RE_ RED _ ORION
12C PROD DB Health

Note: Above attachments is relevant from online submission to supervisor for verification. These won't be readable in hard copy, however, to take care of it the detailed contents of these mail/reports have been captured in relevant sections above.