

Optimus_DDUCT

Major Project Report

Submitted in partial fulfillment of the requirements for the award of the Degree of
Bachelor of Technology (B.Tech)

in

COMPUTER SCIENCE AND ENGINEERING

By

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Under the Esteemed Guidance of
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Associate Professor



**Department of Computer Science and Engineering
ACE ENGINEERING COLLEGE
An Autonomous Institution**

(NBA ACCREDITED B.TECH COURSES: EEE, ECE, MECH & CSE, ACCORDED NAAC 'A'GRADE)
(Affiliated to Jawaharlal Nehru Technological University, Hyderabad, Telangana)

Ghatkesar, Hyderabad - 501 301

MAY 2020



ACE

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CERTIFICATE

This is to certify that the Major project work entitled "**Optimus_DDUCT**" is being submitted by **Koganti Lakshmi Durga(16AG1A0527)**, **Bala Aishwitha Seelam(16AG1A0548)** in partial fulfillment for the award of Degree of **BACHELOR OF TECHNOLOGY** in **COMPUTER SCIENCE AND ENGINEERING** to the Jawaharlal Nehru Technological University, Hyderabad during the academic year 2019-20 is a record of bonafide work carried out by her under our guidance and supervision.

The results embodied in this report have not been submitted by the student to any other University or Institution for the award of any degree or diploma.

Internal Guide

Ganti Krishna Sharma

Associate Professor

Head of the Department

Prof. K. JAYABHARATHI

HOD CSE

EXTERNAL EXAMINER

ACKNOWLEDGEMENT

I would like to express my gratitude to all the people behind the screen who have helped me transform an idea into a real time application.

I would like to express my heart-felt gratitude to my parents without whom I would not have been privileged to achieve and fulfill my dreams.

A special thanks to our Secretary, **Prof. Y. V. GOPALA KRISHNA MURTHY, and** Joint Secretary, **Mrs. M. PADMAVATHI** for having founded such an esteemed institution. I am also grateful to our beloved principal, **Dr. B. L. RAJU** for permitting us to carry out this project.

I profoundly thank **Prof. K. JAYABHARATHI**, Head of the Department of Computer Science and Engineering, who has been an excellent guide and also a great source of inspiration to my work.

I extremely thank **Mr. CH. VIJAYAKUMAR**, Associate Professor, Project coordinator, who helped us in all the way in fulfilling of all aspects in completion of our Major-Project.

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The satisfaction and euphoria that accompany the successful completion of the task would be great, but incomplete without the mention of the people who made it possible, whose constant guidance and encouragement crown all the efforts with success. In this context, I would like to thank all the other staff members, both teaching and non-teaching, who have extended their timely help and eased my task.

DECLARATION

I hereby declare that the project entitled "**Optimus_DDUCT**" which is being submitted by me in partial fulfillment of the requirements for the award of the degree of Bachelors of Technology to the Jawaharlal Nehru Technological University Hyderabad, India either in part or full does not constitute any part of any project submitted by me or any other person to any University/Institute.

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ABSTRACT

Collaboration is a technology used for better communication between individuals, groups or organizations over internet. This mainly uses Voice over IP, telepresence applications. Endpoints of these applications are of various versions, which might need installations and upgradations.

Optimus_DDUCT is an automated tool which will reflect all the phases of Collaboration Infrastructure. To give end users experience of optimized way of deployment, configuring and upgrading collaboration components. For a smooth functioning of voice and video calls.

Installation offers the customer to choose: Hardware components, display devices, touch panel connections, microphone connections; Audio configurations, for multiple microphone connections; License installations. Upgradation involves updating to the suggested or latest codec versions, via an optimized path. In order to show the optimized path between the versions, web scraping is used. Planning and Design would give customers the liberty to setup any kind of collaboration application onto their work site.

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1. INTRODUCTION

1.1 Video Collaboration

Video conferencing has been around for a long time. Until recently, however, it was often limited to executive conference rooms for high-level meetings, special promotions, or corporate presentations. With the advent of lower-cost high-quality technology, using collaboration to communicate is becoming more the norm than the exception. Much of the communication process is achieved using non-verbal cues. With a traditional telephone, you miss out on these important aspects of the conversation. Using collaboration endpoints, call participants can now communicate as if they were in the same room as the call recipient. Face-to-face communication makes it easier to understand what is being said and to read a situation more accurately, thus eliminating potential mistakes and miscommunication. More often than not, you establish a better rapport with that person than if just speaking over a phone. These capabilities are what collaboration brings to the table. There are many different situations where communication may be initiated. Perhaps a person is traveling and connects by using a mobile device. Another person might be sitting at her desk in the office while in another location, a group of people are attending the same meeting in the same room. The number of cameras, screens, and microphones may change depending on the situation. The acquisition of Tandberg, with its broad range of video conferencing products, has given Cisco the opportunity to expand their collaboration product line to include endpoints for any given situation.

1.2 Purpose

The main objective of the project named Optimus_DDUCT is to develop an automated tool which will reflect all the phases of Collaboration Infrastructure. It is developed to give end users experience of optimized way of designing, deployment, configuring and upgrading any collaboration components for a smooth functioning of voice and video calls. The DDUCT stands for Develop, Deploy, Upgrade, Configure and Troubleshoot.

Previously information provided to customers is scattered across various Cisco platforms. There is no customized/optimized approach for making the data be delivered to end users by the means of a single platform. The introduction of Optimus_DDUCT helps overcome that problem by providing all the required and necessary data in a single platform in an interactive and virtual way.

This provides a single platform to meet all the user's requirement. It helps in treating the customers as assets that will increase in value by providing services in a constructive ways. This helps in resulting to a direct customer impact with delivery efficiency and case deflection.

2. LITERATURE SURVEY

Consider someone who is owning a cisco endpoint WebEx DX 80, and if the system asks for upgradation then naive user has to go through many documentations, articles, blogs and sites. And even after finding the site, user cannot actually locate the necessary version corresponding to that endpoint.

In another scenario, if user desires to find the bugs associated with endpoints, it's not so easy to figure out the bugs. If there is necessity to replace the parts of the endpoint, then the user might need part id information, so there would be a lot of content and all the data would be dispersed.

Moreover the number of cases were huge as customers needed support in set up and installation and also they were not able to trace out the peripherals compatible nor had idea about how would there installation go.

The crisp of all the shortcomings without a uniform platform were:

- Adhoc search of information
- Difficulty in finding resources
- Time Consuming
- Lack of user friendliness
- Need to go through lot of information.
- Had to dig the data to understand
- Increase in number of cases for Engineering Team.
- Scattered Data
- No idea about the license requirements for customer.
- No information about Compatibility for customer
- No scope for design simulations.

All these limitations have leveraged necessity for evolution of a single platform that could address all these issues and produce better user experience that could help in:

- Organized data format
- Time Saving
- User friendly
- Acts as Single platform for multiple purposes.
- Simulate own designs
- Limited data to look for
- Provide information about compatibility
- Show the set up and installation procedures.

3. SOFTWARE DESIGN

3.1 Behavioral UML Diagrams:

3.1.1 Use Case Diagram:

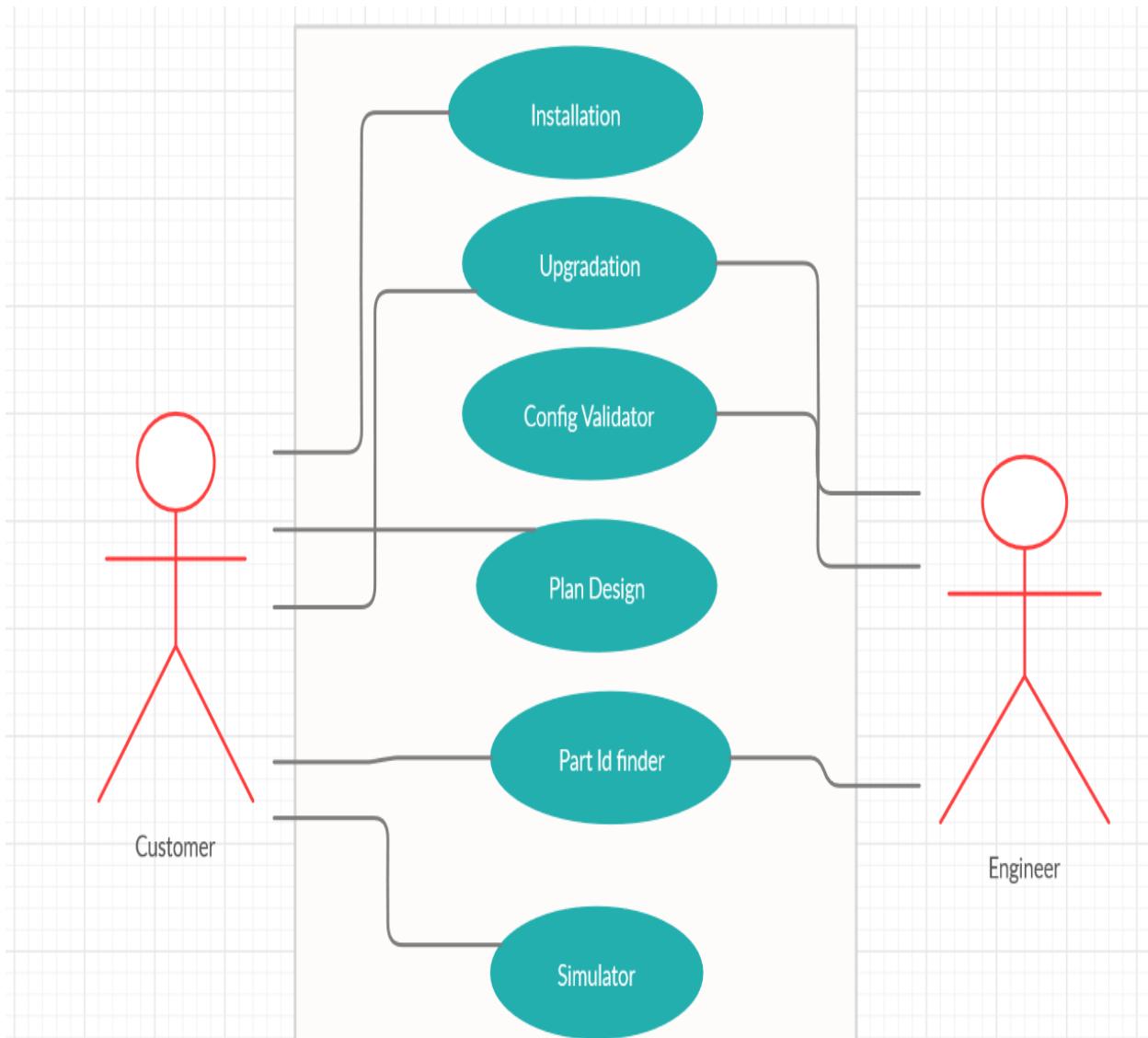


Fig: 3.1 Use case diagram

3.1.2 Activity diagram:

3.1.2.1 For Installation:

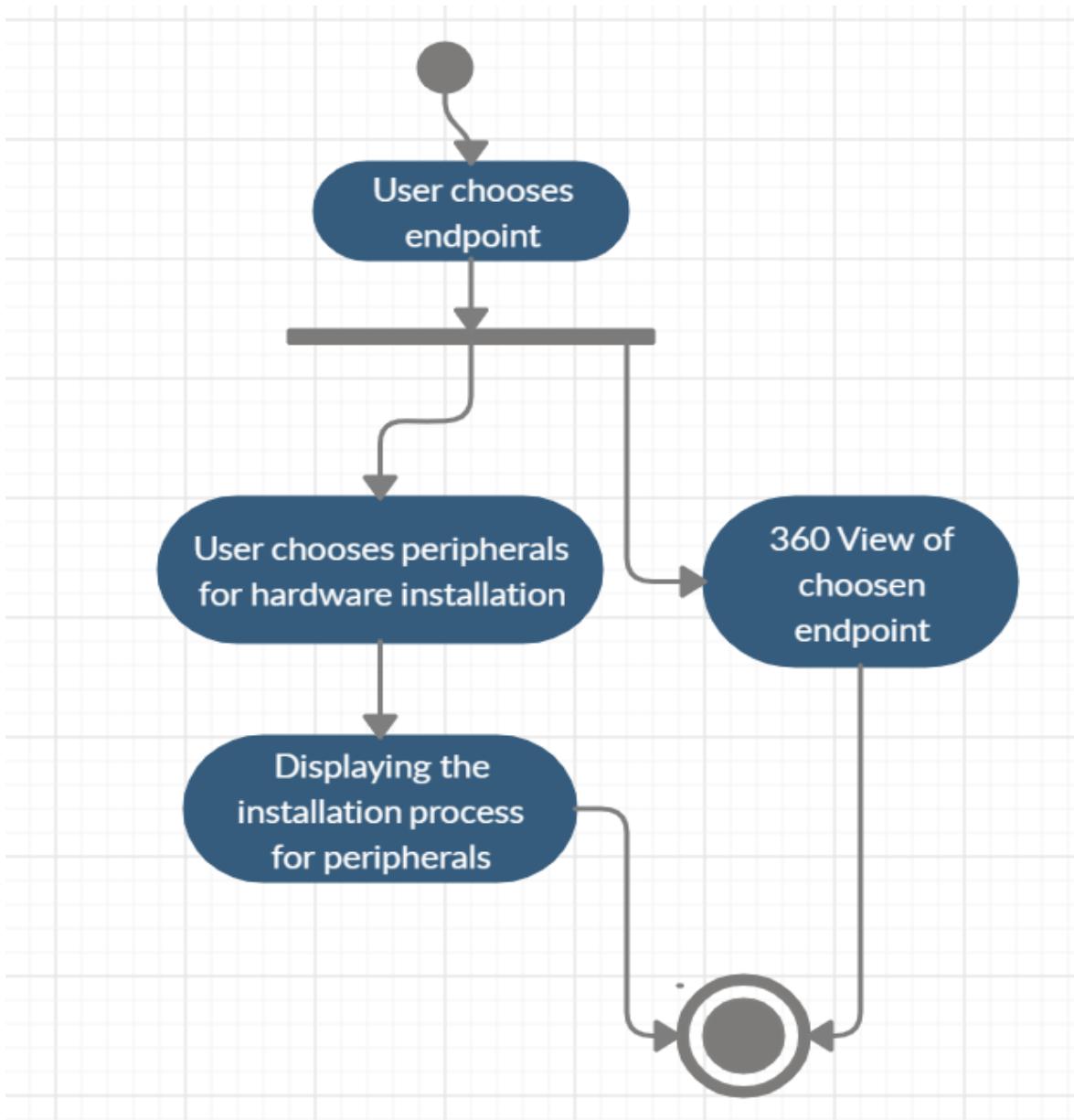


Fig: 3.2.1.1 Activity Diagram for Installation

3.1.2.2 For Upgrade:

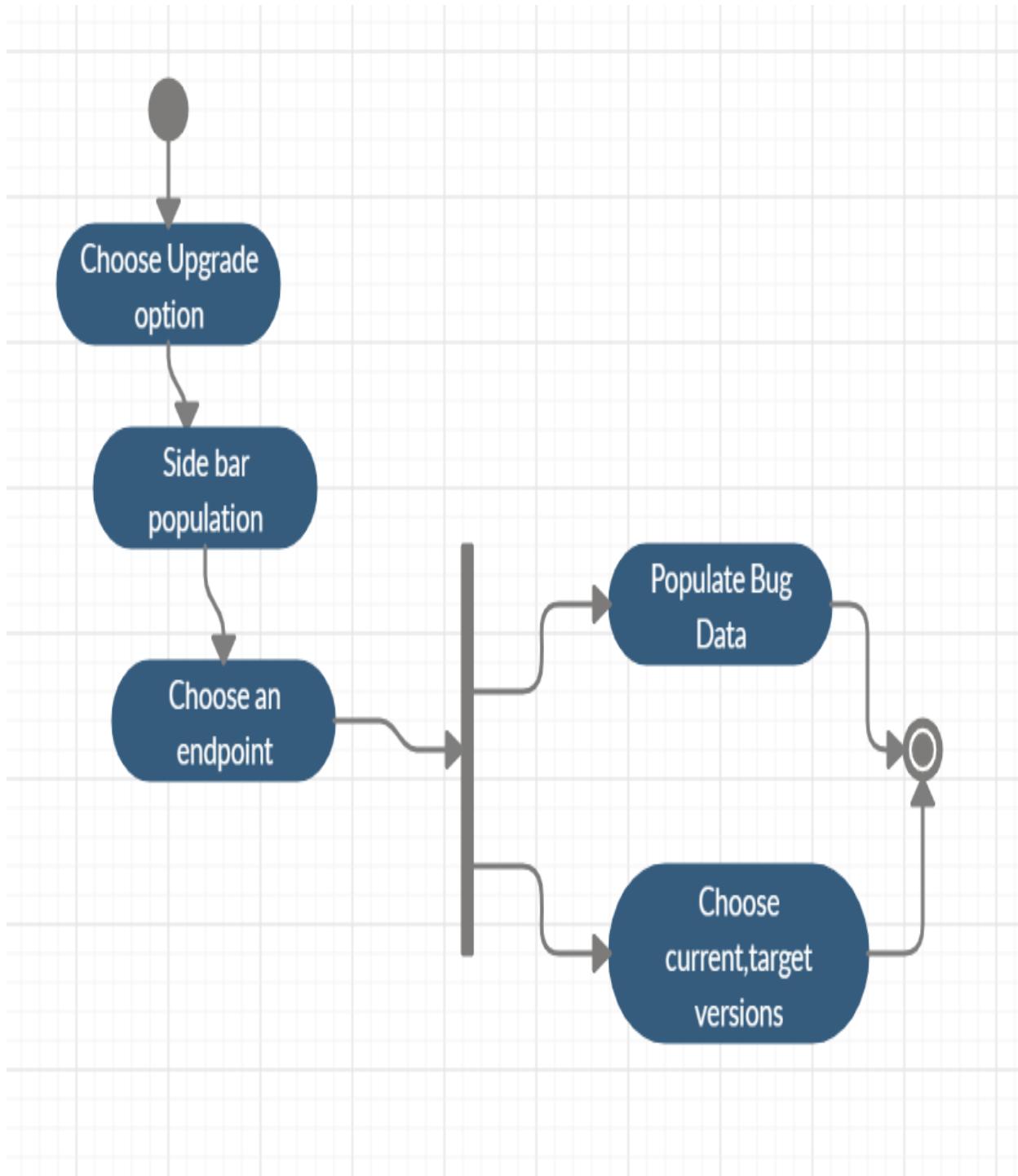


Fig: 3.2.1.2 Activity Diagram for Upgrade

3.1.2.3 For Part ID:

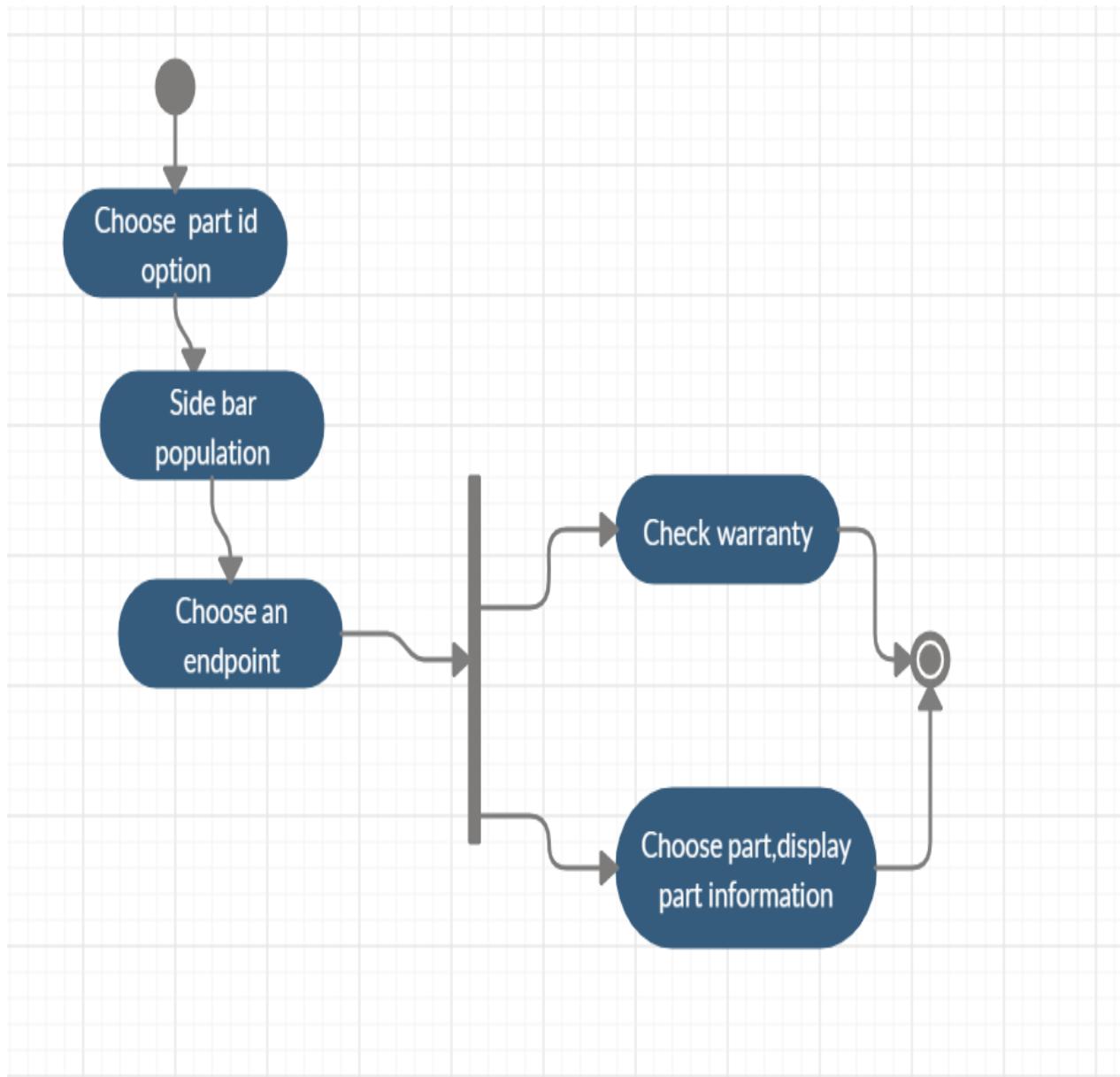


Fig: 3.2.1.3 Activity Diagram for PartID

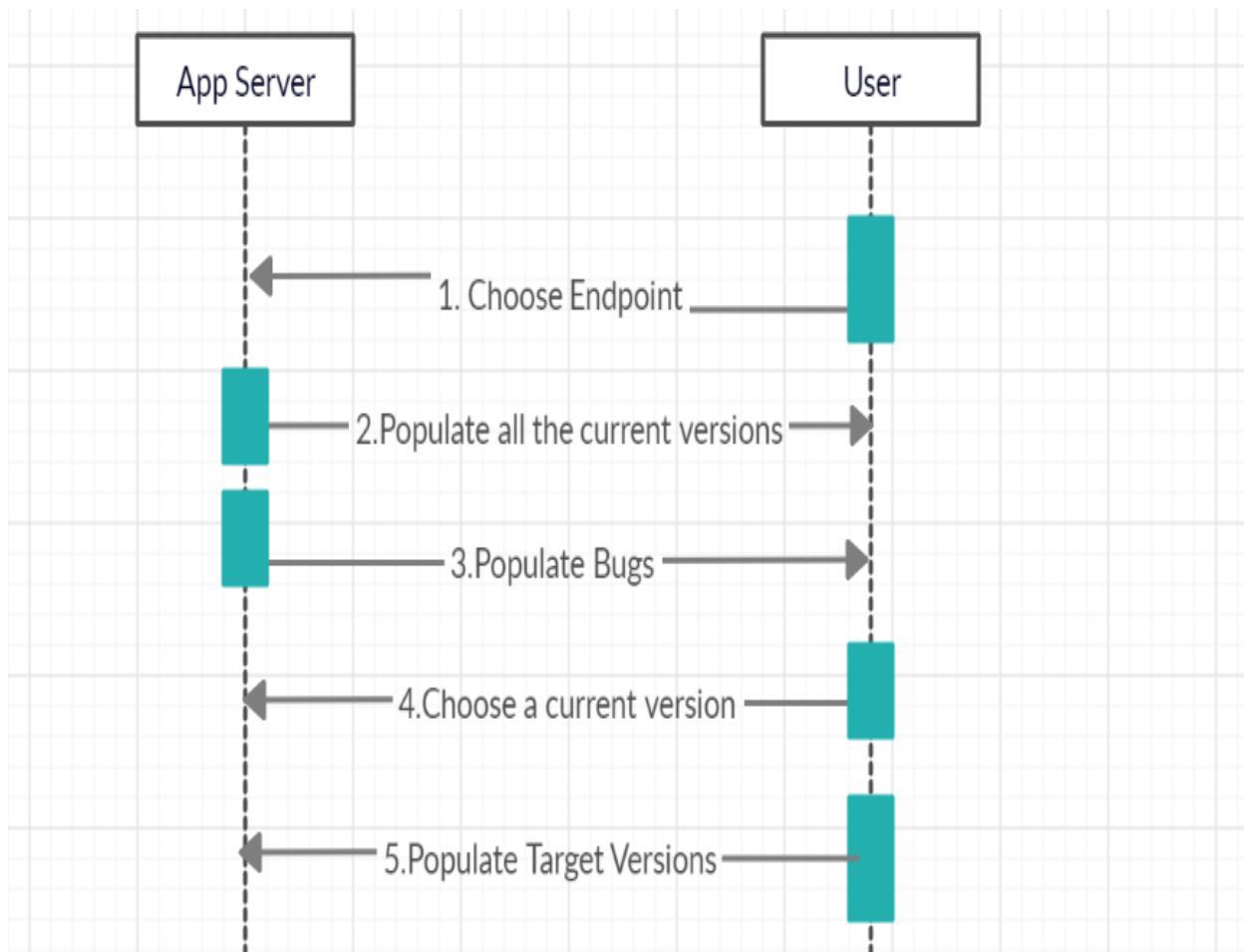
3.1.2.4 Sequence Diagram:

Fig: 3.2.1.4 Sequence Diagram

3.2 Structural UML Diagrams:

3.2.1 Class Diagram:

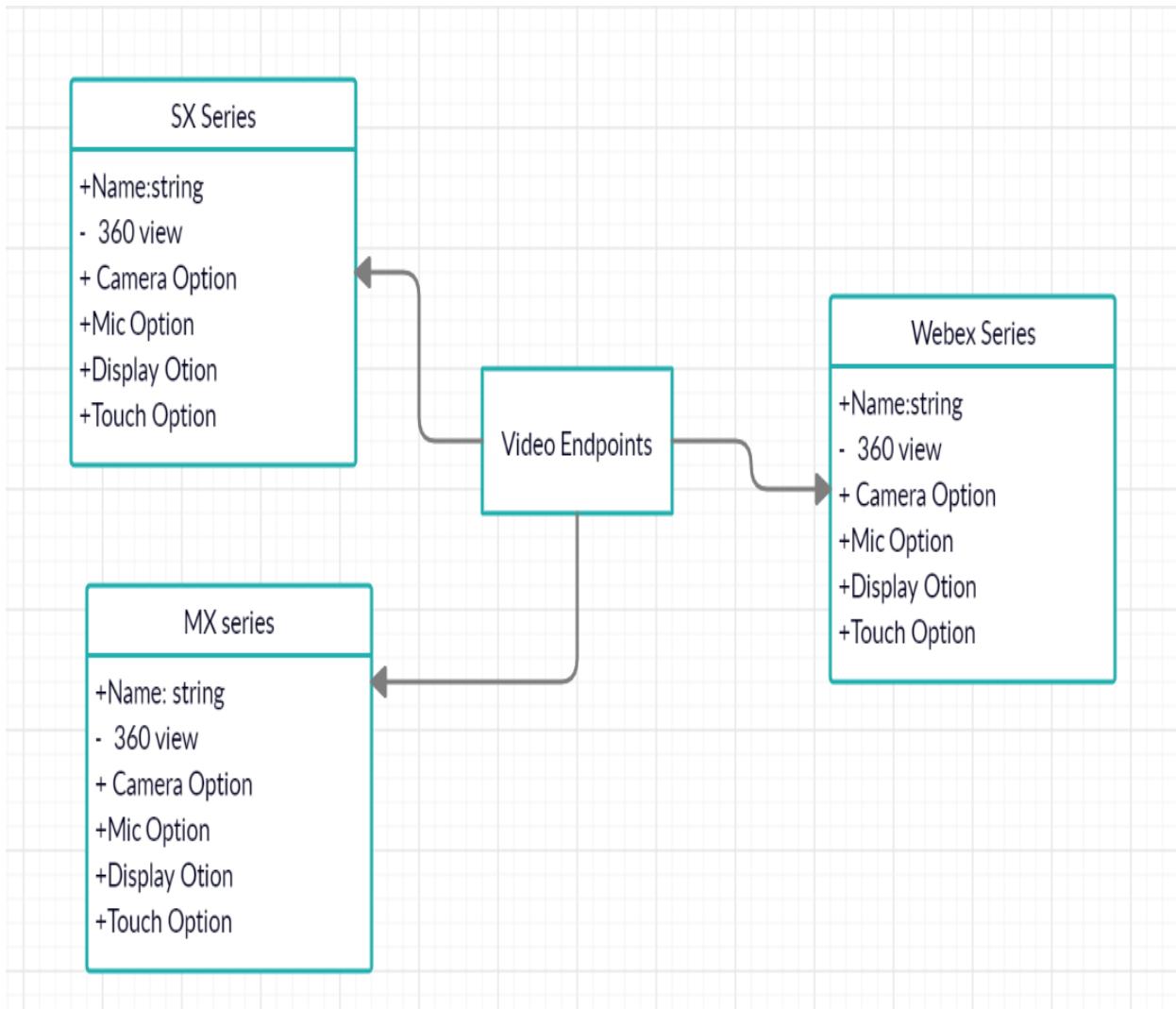


Fig: 3.2.1 Class Diagram

4. MODULES

Optimus is a platform that provides the wholesome information about various types of endpoints and expressway series, software essentials for endpoint installation.

It includes the functionalities:

1. Installation
2. Upgradation
3. Configuration Validation
4. Part ID Information
5. Designing the Deployment Modules
6. Simulation of designs

It's a platform that can be used to give an overall view of all the endpoints right from installation till the deployment. Installation includes procedures for hardware set up, Basic Configuration, Log captures, Licenses. While Upgrade would list out the compatible target versions depending on the current versions. Next, Part Id would identify the different parts associated with an endpoint and their part Information. Part Id will be helpful when there is requirement for replacement of the endpoints. Simulator helps in simulating the architectural designs using different solutions.

Configuration Validator would help in validating the configurations during set up which can be used by the engineering team for troubleshooting purposes, and Plan design would help the user understand the essentials for deployment.

It helps users in understanding:

1. Hardware components.
2. Procedure for installation.
3. Set up process.
4. Parts of various end points.
5. All round view of endpoints.
6. Log Capture mechanisms.
7. Configuration file fetching.
8. Hardware installation.
9. Bug Information of various endpoints.
10. Compatible upgrade versions.
11. Simulation of Designs.
12. Designing that uses different solutions.

4.1 Glance of Optimus_DDUCT:

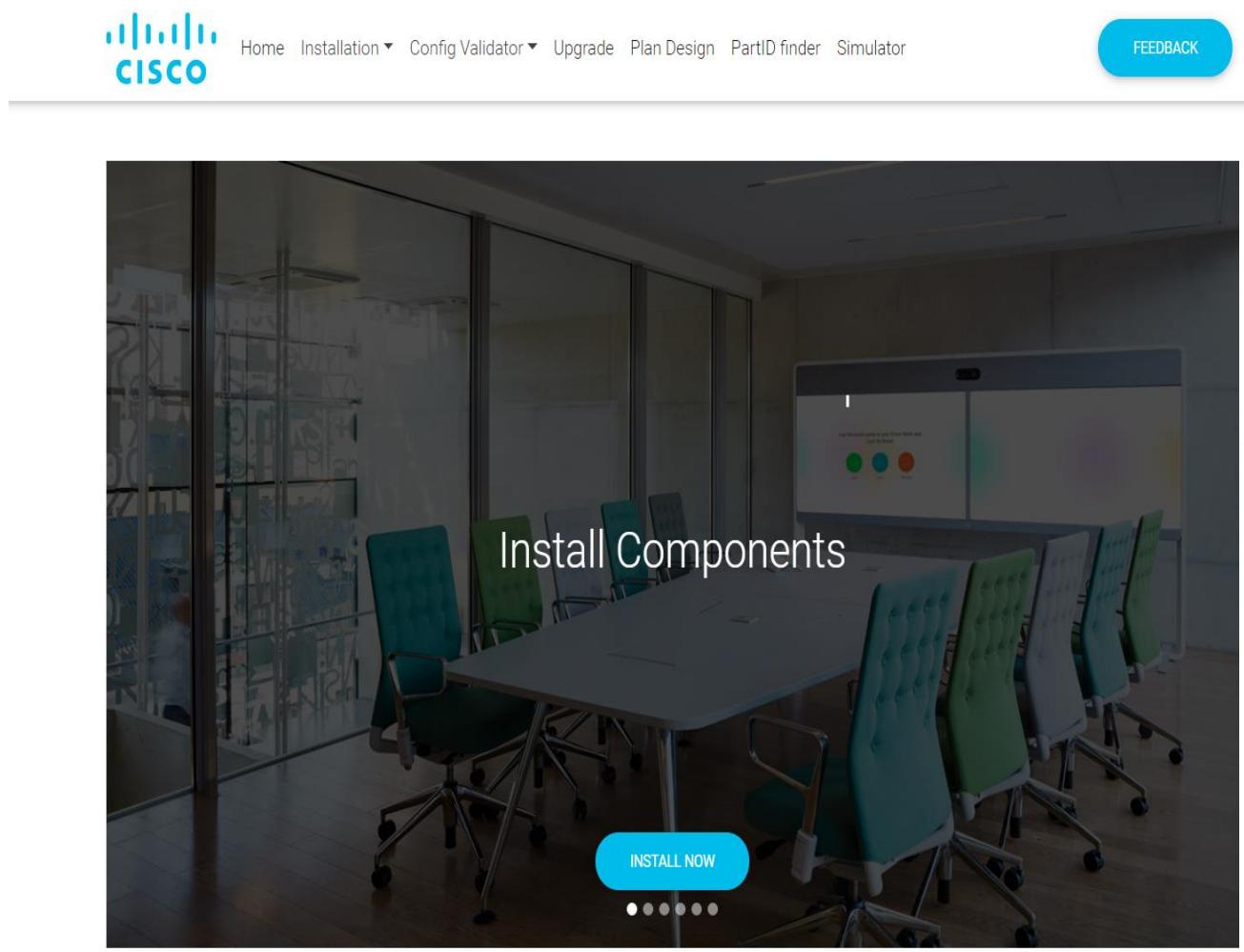


Fig: 4.1 Glance of Optimus_DDUCT

4.2 Installation:

This page as a whole gives information about various devices that includes categories of Collaboration endpoints, TMS, CMS, VCS.

Collaboration Endpoints:

- SX 10

The Cisco TelePresence SX10 Quick Set is an all-in-one unit designed to video-enable small collaboration spaces. It is a high quality unit that combines camera and codec into a compact device that is mounted over a standard flat-panel display. It can be connected to power and LAN through a single cable for both power and Ethernet (PoE).



Fig: 4.2.1 SX10

- SX 20

The Cisco TelePresence SX20 Quick Set can transform a standard flat panel display into a powerful telepresence system. Whether you are just getting started with video communications or implementing a large-scale deployment, the SX20 Quick Set delivers high quality performance.



Fig: 4.2.2 SX20

- DX 80

The Cisco DX70 and DX80 are all-in-one units designed to video enable small collaboration spaces. They are high quality featuring high-definition (HD) video, unified communications features, a display for your laptop, and expanded capabilities.



Fig: 4.2.3 DX 80

- MX 700 Dual, MX 800 Single, MX 800 Dual

The MX700 and MX800 systems come standard with a builtin amplifier and speaker system for high fidelity sound. You can choose from a single camera or a dual camera speakertracking solution for MX700 and MX800 Single; MX800 Dual comes only with the dual camera speaker-tracking solution. Both cameras deliver the best possible video imaging with up to 20x zoom and 1080p60 resolution. Premium resolution and dual display are also standard features on the MX700 and MX800. The Cisco TelePresence Touch 10 provides an easyto-use interface for both MX700 and MX800 systems.



Fig: 4.2.4 MX700 Dual, MX 800 Single, MX 800 Dual

- MX 200 G2 , MX 300 G2

MX200 G2 and MX300 G2 blend aesthetics, functionality and ease of use. 1080p60 high-definition (HD) performance and new features such as dual display and an embedded four-way MultiSite conferenceing option deliver more power and flexibility. The Cisco TelePresence Touch 10 user interface offers a larger screen size and a user-friendly experience.



Fig: 4.2.5 MX 200 G2 , MX 300 G2

- **Webex Roomkit**

Cisco Webex Room Kit includes camera, codec, speakers, and microphones integrated in a single device. It is easy to mount, and integrates well with flat panel displays through HDMI CEC. The Room Kit is designed for small to medium-sized meeting rooms and team collaboration rooms. It brings sophisticated features, which were previously the domain of higher-end video conferencing rooms, to every room and every team.



Fig: 4.2.6 Webex Roomkit

- **Webex Roomkit Plus**

Cisco Spark Codec Plus, is a powerful collaboration solution that integrates well with flat panel displays through HDMI CEC. The codec is rich in functionality and easily scalable to all of your conference rooms and spaces.



Fig: 4.2.7 Webex Roomkit Plus

- **Webex Room 55**

The Room 55 is designed for small to medium-sized meeting rooms and team collaboration rooms. It brings sophisticated features like speakertracking, which were previously the domain of higher-end video conferencing rooms, to every room and every team.



Fig: 4.2.8 Webex Room 55

- **Webex Room 70**

The Room 70 comprises a powerful codec, a quad-camera, and 70" single or dual 4K screen(s) with integrated speakers and microphones*. A solution ideal for rooms that seat up to 14 people. It offers sophisticated camera technologies that bring speaker-tracking and auto-framing capabilities to medium to large-sized rooms. The product is rich in functionality and experience and has been designed to be easily scalable to all of your conference rooms and spaces — whether registered on the premises or to Cisco Spark through the Cisco Collaboration Cloud.



Fig: 4.2.9 Webex Room 70

CMS:

Cisco Meeting Server software can be hosted on specific servers based on Cisco Unified Computing Server (UCS) technology as well as on the X-Series hardware, or on a specification-based VM server.

VCS:

The Cisco TelePresence Video Communication Server (VCS) software simplifies session management and control of telepresence conferences. It provides flexible and extensible conferencing applications, enabling organizations to benefit from increased employee productivity and enhanced communication with partners and customers.

TMS:

Cisco TelePresence Management Suite (Cisco TMS) enables you to manage, deploy, and schedule your entire video network, including telepresence, from one platform. Cisco TMS provides visibility and centralized control for on-site and remote video systems, and aims to make telepresence accessible and successful within an organization.

4.2.1 360° View:

Gives a visual experience of how an endpoint looks from all the possible dimensions. This option is available with all endpoints. (Eg: Installation→Endpoints→SX10→360 View)
Dragging the mouse across the displayed picture would give a different view of device.
It gives a much clear view of how the device looks and also highlights various ports that can be used for integrating with other devices like display, microphone etc. if they are not within the device.

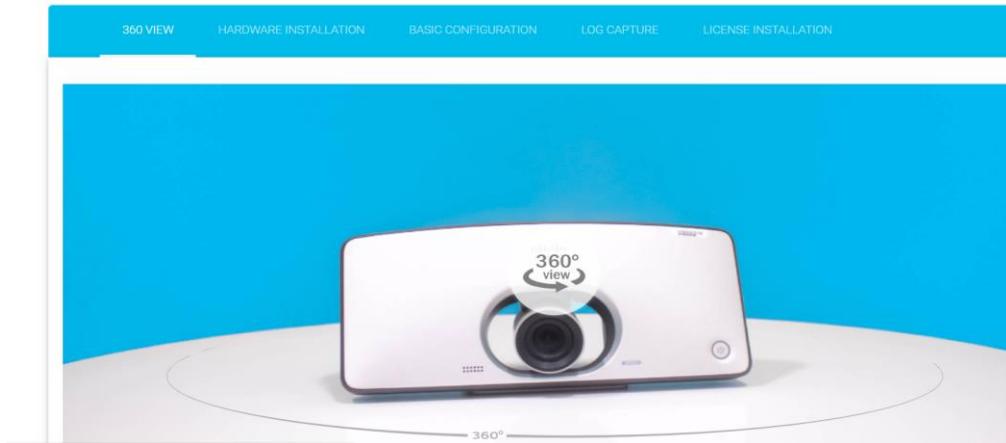


Fig: 4.2.1.1 360 View

4.2.2 Hardware Installation:

Gives information about various auxiliary devices like camera ,display ,microphone etc. that can be integrated or already inbuilt within the codec.Available for all devices.Each auxiliary device is provided with multiple options depending on compatibility.Allows user to know different devices that can be integrated with endpoints and various options that can be used for integration depending on the compatibility factor.All the device information is stored into the database and projected onto the front end using python script.

Precision 60 Camera

A powerful integrator solution for large meeting rooms, this 10x optical zoom camera has the best image quality in the industry, superior adaptability to light conditions, and is ideal for use with the Cisco SX80 Codec.



Fig: 4.2.2.1 Precision 60 Camera

Precision 40 Camera

With exceptional range for mid-sized rooms and spaces, this camera is ideal for use with the Cisco TelePresence SX20 Quick Set and has 4x optical zoom and 8x total zoom.



Fig: 4.2.2.2 Precision 40 Camera

Speaker Track 60

SpeakerTrack 60 employs a unique dual-camera approach. With one camera, it quickly locates the active speaker and presents a close-up of that speaker. At the same time, the other camera readies to seek and display the next active speaker. This results in very fast camera switching and an uninterrupted meeting experience.



Fig: 4.2.2.3 Speaker Track 60

PTZ Camera

The PTZ camera delivers 12x optical and 12x digital zoom. It also offers a high level of flexibility for custom and specialized integrations.



Fig: 4.2.2.4 PTZ Camera

Microphones for Cisco video conference systems

Cisco Microphones are audio solutions for integrated video systems and custom video deployments. These can be positioned on the table or discreetly on the ceiling. The microphones are optimized for voice and include options for small-to-large collaboration meeting rooms and specialized spaces.



Fig: 4.2.2.5 Microphone for Cisco Video conference systems

A screenshot of a web-based Cisco installation wizard. At the top, there's a navigation bar with the Cisco logo, followed by links for Home, Installation, Config Validator, Upgrade, Plan Design, PartID finder, and Simulator. A blue 'FEEDBACK' button is on the right. Below the navigation is a horizontal tab bar with '360 VIEW' (selected), 'HARDWARE INSTALLATION' (highlighted in blue), 'BASIC CONFIGURATION', 'LOG CAPTURE', and 'LICENSE INSTALLATION'. The main area contains several dropdown menus and input fields: 'Choose Camera' (set to 'Integrated Camera'), 'Choose Display' (set to 'Additional Display'), 'Choose Touch Controller' (set to 'Touch Panel'), 'Choose Microphone' (set to 'Cisco Ceiling Microphone G2'), 'Choose Presentation' (set to 'Presentation'), and a 'SUBMIT' button at the bottom.

Fig: 4.2.2.6 Hardware Installation Page

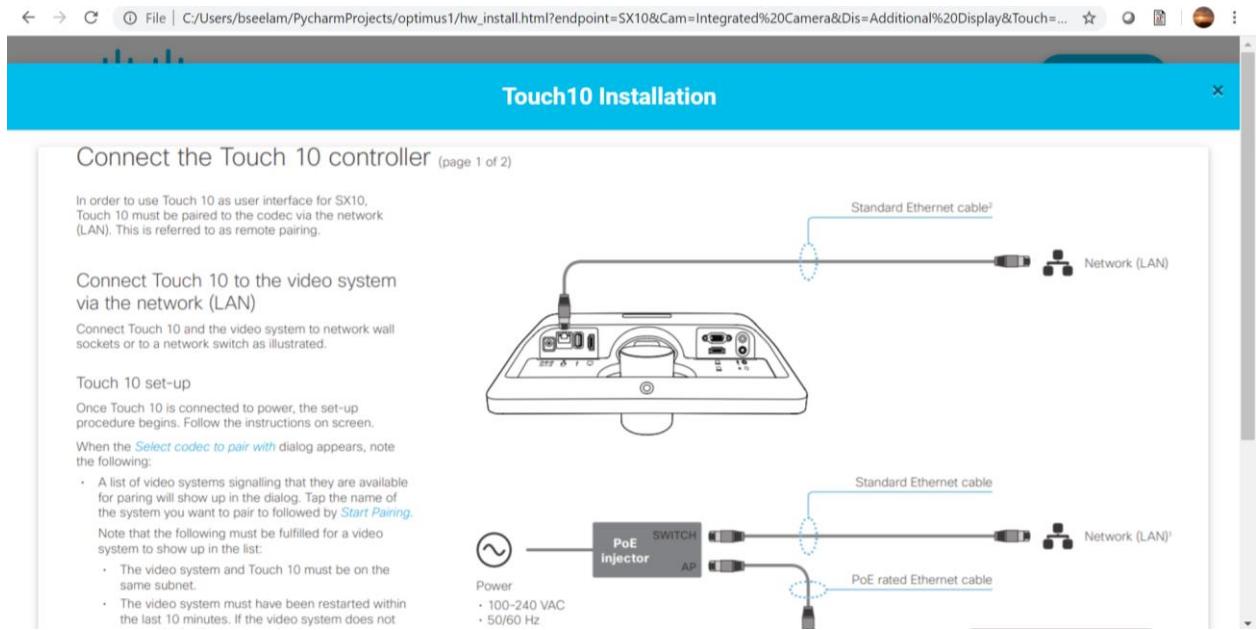


Fig: 4.2.2.7 Touch10 Installation

4.2.3 Basic Configuration:

Gives values of various factors and attributes that are necessary for the setup and working of the endpoints. Available for all devices. These include setup details required for conferencing, network, network services, video etc. Renders clear picture of all setup requirements and their values.

H.323 is a Recommendation from the ITU Telecommunication Standardization Sector (ITU-T) that defines the protocols to provide audio-visual communication sessions on any packet network. The H.323 standard addresses call signaling and control, multimedia transport and control, and bandwidth control for point-to-point and multi-point conferences. It is widely implemented by voice and video conferencing equipment manufacturers, is used within various Internet real-time applications.

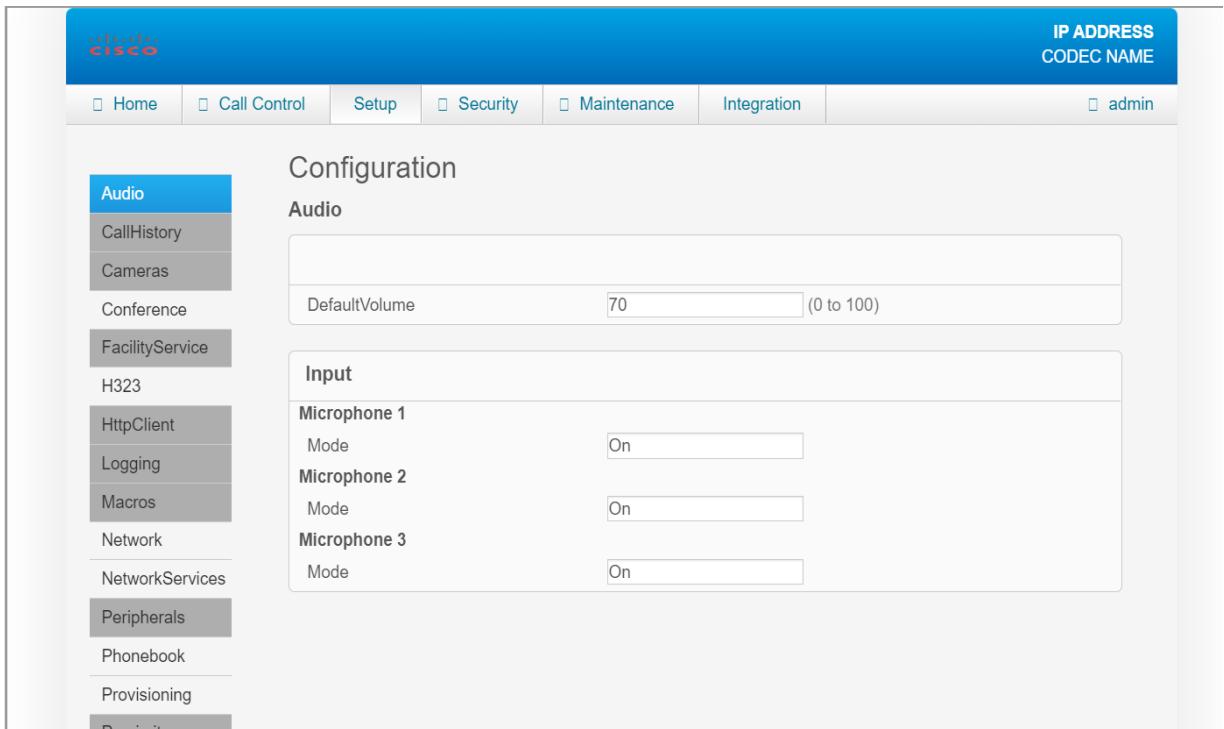


Fig: 4.2.3.1 Basic Configuration

4.2.4 Log Capture and License Installation:

Log Capture would help in knowing logs of the device helps in tracking if there are any issues or problems with device. License Installation shows a detailed procedure how to make installation of devices right from login till option key installation. Available for all devices. One can opt for option keys depending on the requirement. Help in maintenance of each and every device specifically.

File Name	Size	Last modified
auth.log	77 kB	2020-02-27 16:59
dhclient.log	4 kB	2020-02-27 12:44
dmesg	86 kB	2020-02-25 10:54
evenlog/all.log	406 kB	2020-02-27 16:59
evenlog/all.log.first	513 kB	2020-02-25 23:34

Fig: 4.2.4.1 Log Capture and License Installation

4.3 Upgrade:

Gives information about various devices along with current versions and target versions and helps in upgrading the device versions. Also gives information of the bug information about each of the codecs. Enables a user to select a codec and accordingly choose a current version and know the target versions available for upgradation. Makes all the bug data and upgrade information readily available. Web Scraping: All the current and target versions have been scraped from online site that had different pages for different devices using Selenium through a python script with the help of xpath. The versions data present in the database are retrieved through python script with event responsive code in javascript.

Upgrade the system software (page 1 of 2)

About upgrading from TC to CE software

CE8.0 is the evolution of TC7.x software. CE8.0 inherits years of development in the TC software while being more streamlined, providing higher quality and higher feature velocity.

It is important to carefully consider the upgrade requirements of CE8.0 and the functionality changes compared to TC7.x software before upgrading.

We highly recommend upgrading endpoints to TC7.3.3 or later before proceeding with the upgrade to CE8.0. Upgrading to CE software from TC7.3.0 and TC7.3.1 is not supported via the web interface.

If you do not take into account these considerations, upgrading to CE8.0 can leave you with a non-functioning deployment that requires you to downgrade.

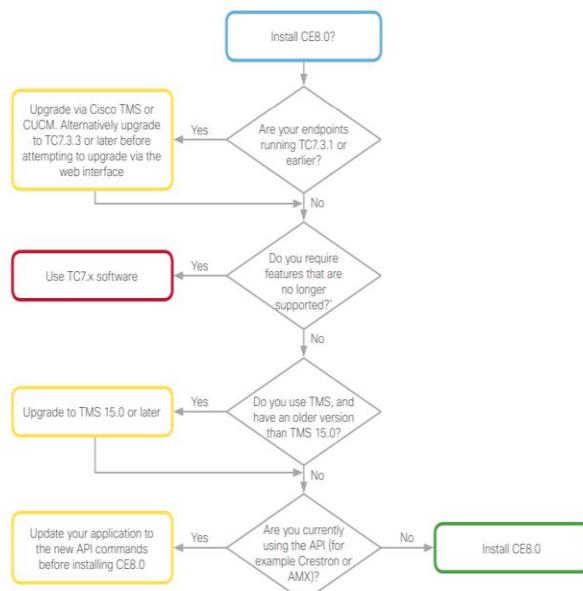


Fig: 4.3.1 Upgrade

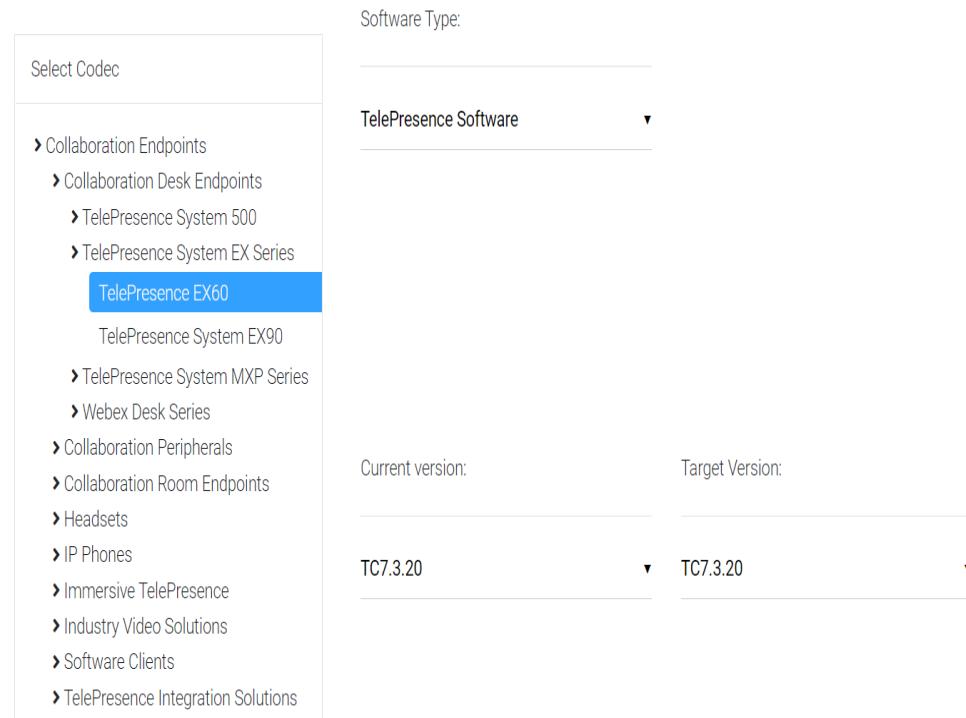


Fig: 4.3.2 Upgrade

Show entries		Search			
	10				
	Bug Id	BUG headline	Bug Severity	Bug Status	Known Fixed Releases
▼	CSCuu82576	Evaluation of sixth-gen-phones for OpenSSL June 2015	Severe	Fixed	10.2(4)JBT0.456 10.2(5.60)
▼	CSCut08817	VPN has critical security patches in it's latest drop	Severe	Fixed	10.2(4)JBT0.164
▼	CSCut46198	MARCH 2015 OpenSSL Vulnerabilities	Severe	Fixed	10.2(4)JBT0.221 10.2(4)JBT0.224
▼	CSCuu82577	Evaluation of sixth-gen-phones for OpenSSL June 2015	Severe	Fixed	10.2(4)JBT0.421 10.2(4)JBT0.434 10.2(4)JBT0.442 10.2(5.60)
▼	CSCuv59308	DX devices vulnerable to Stagefright Android vulnerability	Severe	Other	
▼	CSCux41471	Evaluation of sixth-gen-phones for OpenSSL December 2015 vulnerabilities	Moderate	Other	
▼	CSCut46631	MARCH 2015 OpenSSL Vulnerabilities	Severe	Other	
▼	CSCux41470	Evaluation of sixth-gen-phones for OpenSSL December 2015 vulnerabilities	Moderate	Terminated	

Fig: 4.3.3 Upgrade

4.4 Part ID Finder:

Gives part id information of all the devices of all the codec. Enables a user to choose a codec and see the list of products along with codec like power cord, mounting kits etc. Make all the part id devices readily available. The versions data present in the database are retrieved through python script with event responsive code in javascript.

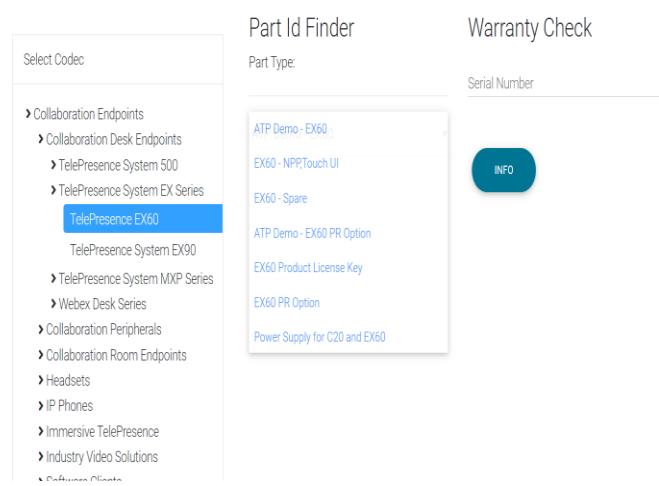


Fig: 4.4.1 PartID Finder

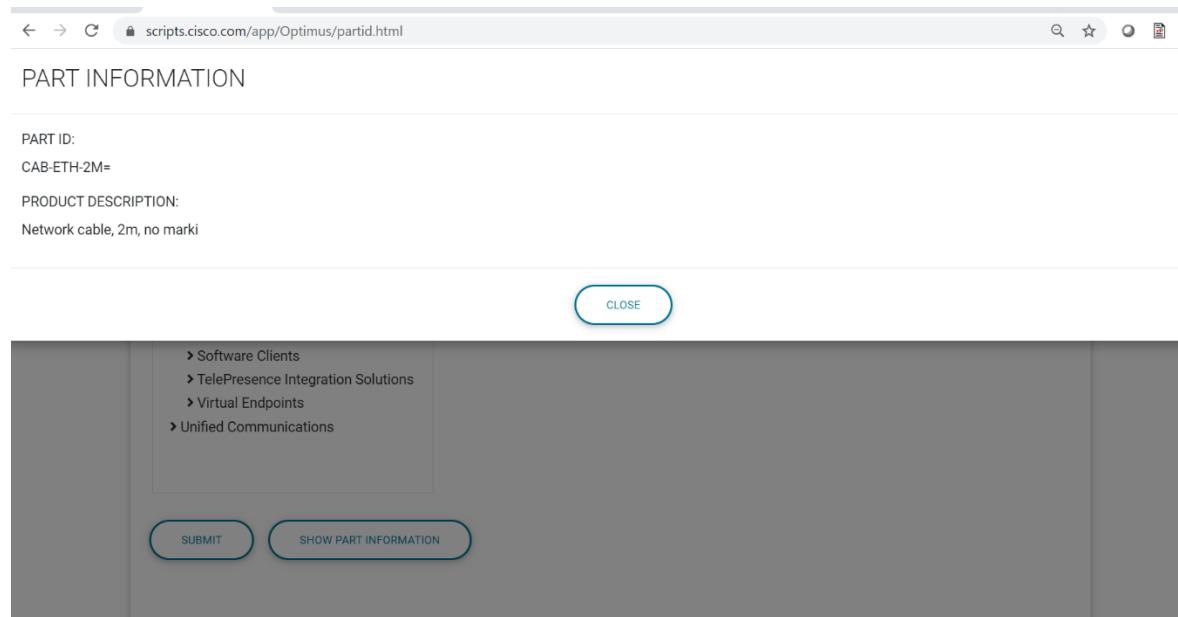


Fig: 4.4.2 PartID Finder

4.5 Config Validator

Validates the configuration. Used for troubleshooting by availing the configuration of different solutions. Makes the error spotting easy. JSPDF ,primarily javascript is used to download the configuration files in the form of pdf, and python is used for data collection from form elements.

The screenshot shows the Cisco Configuration Validator interface. At the top, there is a navigation bar with the Cisco logo and links for Home, Installation, Config Validator, Upgrade, Plan Design, PartID finder, Simulator, and a blue FEEDBACK button. Below the navigation bar, there is a horizontal menu with tabs: EXPRESSWAY-C, EXPRESSWAY-E, CERTIFICATES, PORT RANGE, and TROUBLESHOOTER. The EXPRESSWAY-C tab is selected. The main content area contains two sections: 'SIP Settings' and 'NTP Settings'. In the 'SIP Settings' section, there is a 'SIP Mode:' dropdown set to 'ON'. In the 'NTP Settings' section, there is an 'Authentication Mode:' dropdown set to 'Disabled', an 'NTP Server Address' input field containing '10.23.22.1', and a 'Time zone' dropdown with options '(GMT-08:00) Pacific Time (US & Canada)' and 'Canada'.

Fig: 4.5.1 Configuration Validator

4.6 Plan Design

This module helps in getting brief idea about different solutions and also enables user to understand how does a deployment look. It is directed to Config validator to validate the configuration done on the user side.

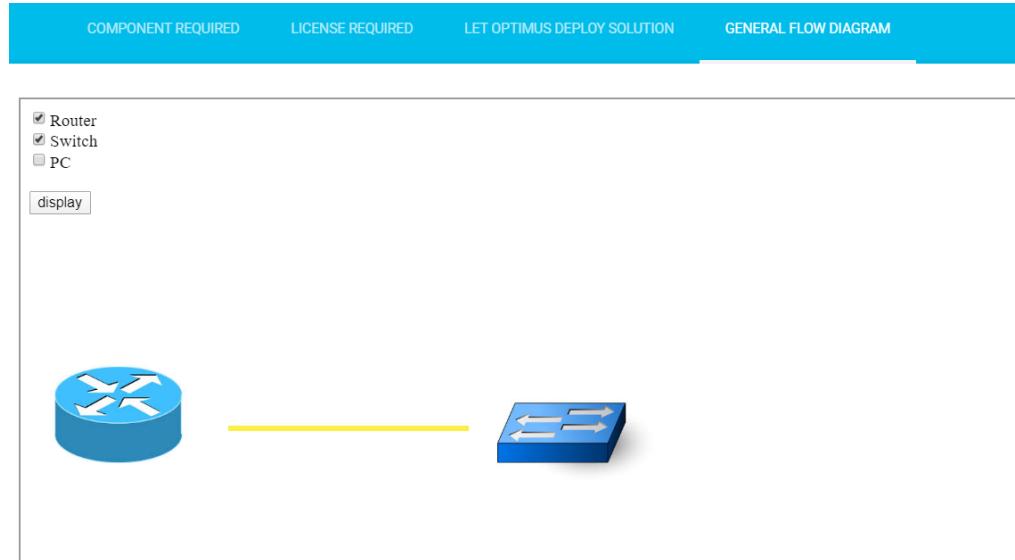


Fig: 4.6.1 Plan Design

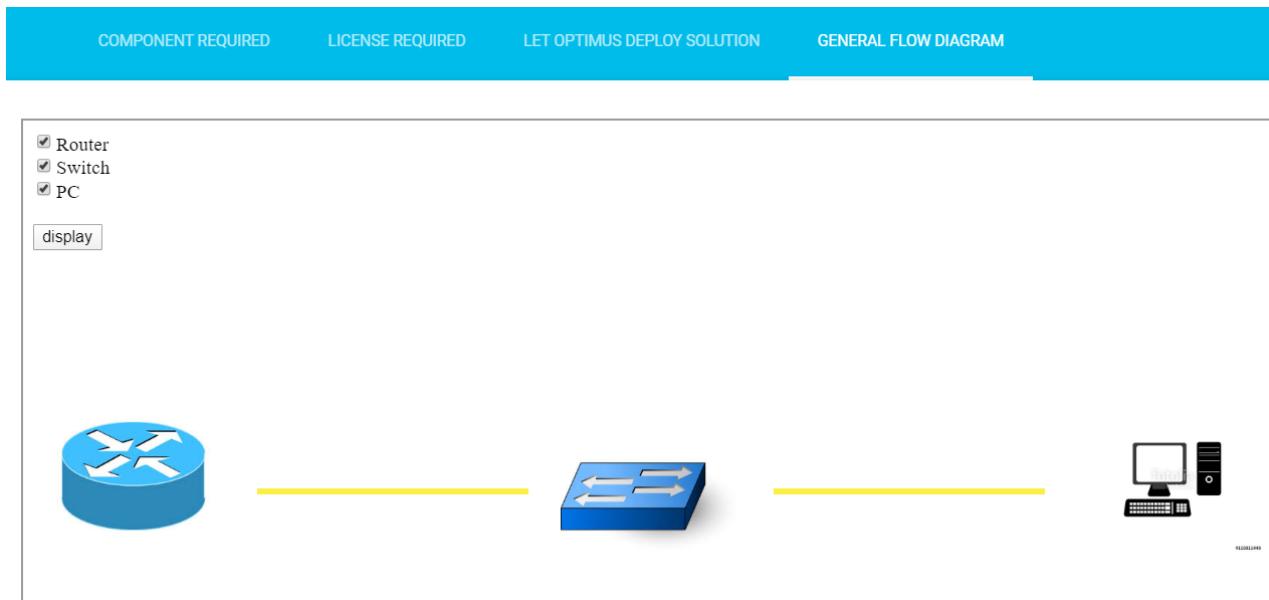


Fig: 4.6.2 Plan Design

4.7 Simulator

User can make own simulations using the virtual representation of devices. User can drag and drop the virtual devices on to the work space and make new connections. Users can simulate designs according to their own requirement. Users can click on the logo of a device and drag it onto the workspace and connections can be dragged by clicking on the logos. HTML for placing the logos, Javascript for making the drag and drop, Python to respond to drag events.

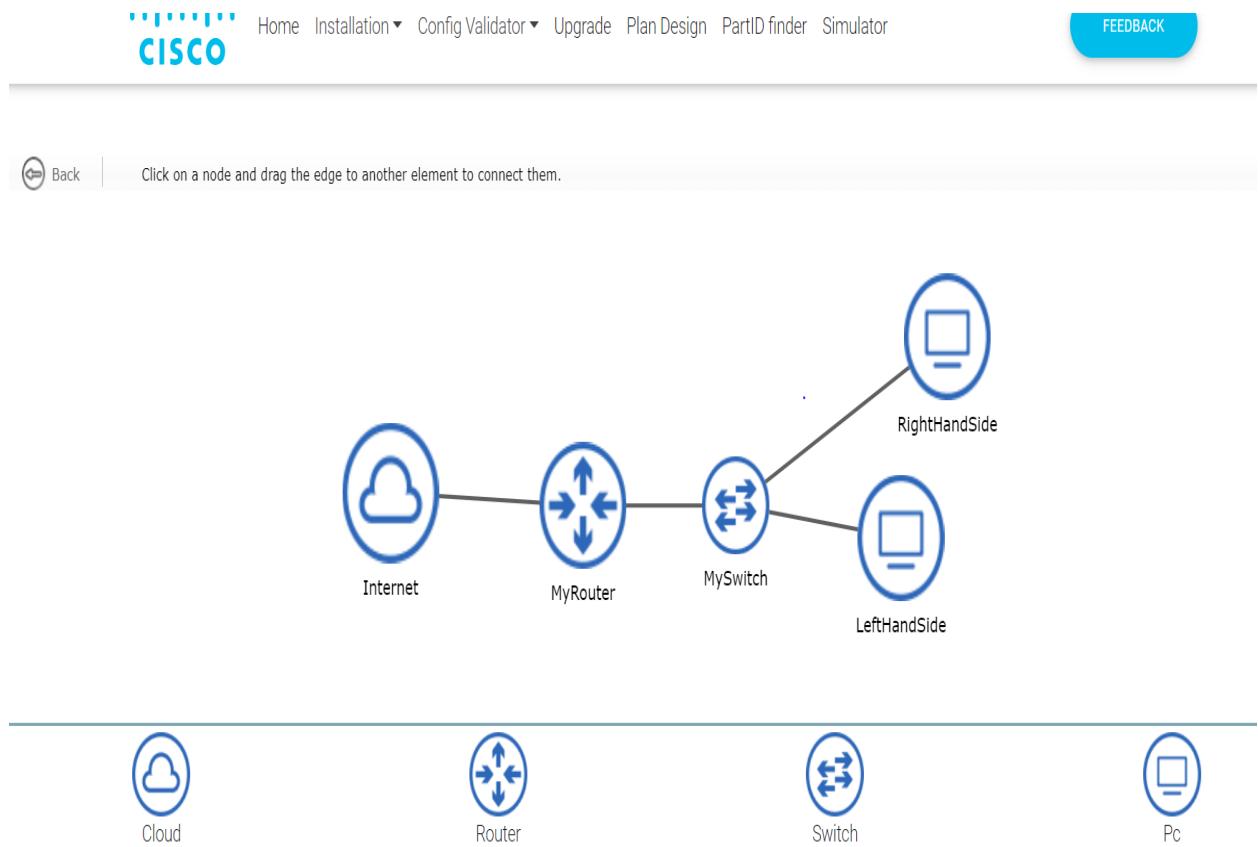


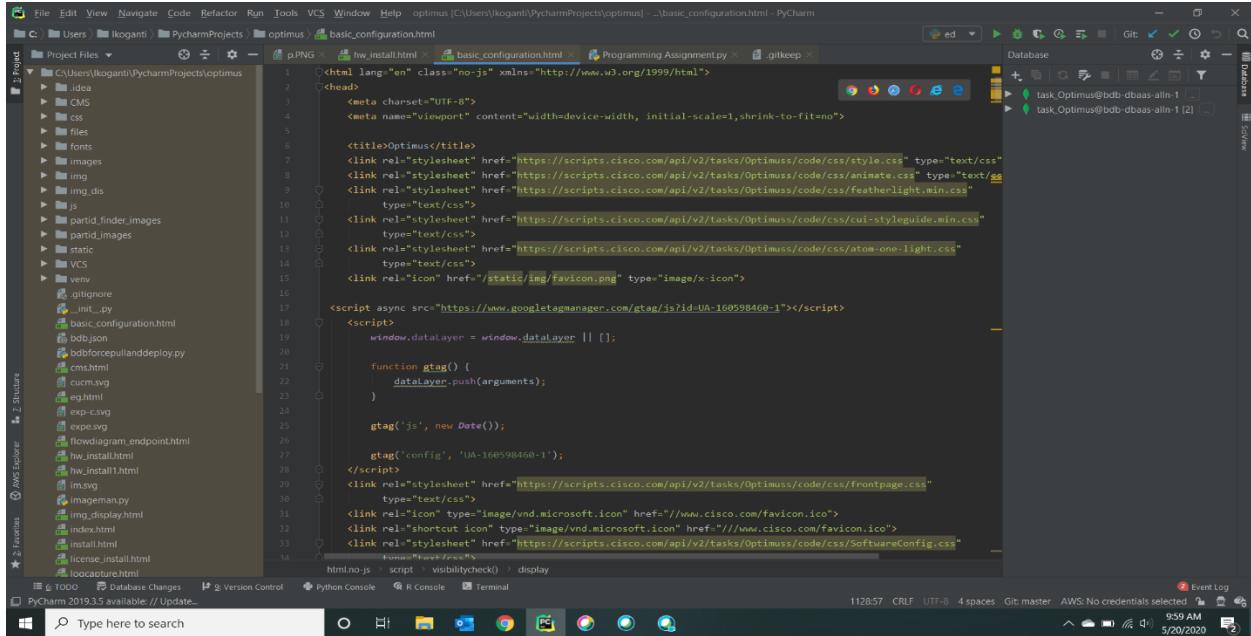
Fig: 4.7.1 Virtual Simulator

5. IMPLEMENTATION

5.1 Coding:

5.1.1 Basic Configuration:

The basic configuration page contains different features like call control, setup, security, maintenance, integration.

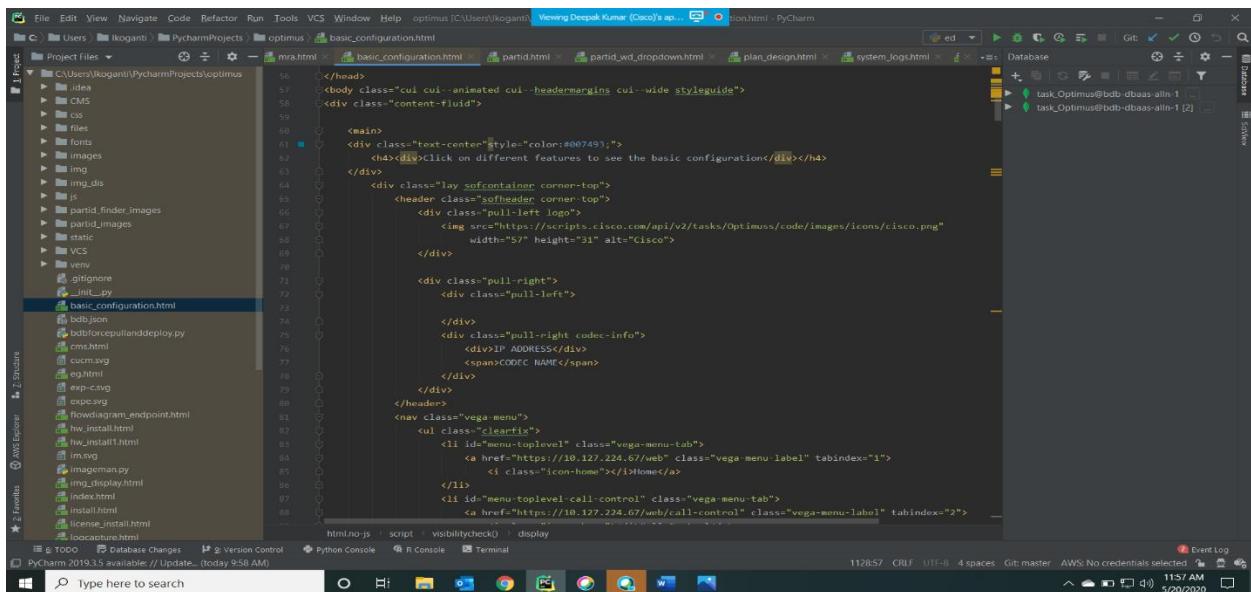


```

<html lang="en" class="no-js" xmlns="http://www.w3.org/1999/xhtml">
    <head>
        <meta charset="UTF-8" name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no" type="text/css"/>
        <title>Optimus</title>
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimuss/code/css/style.css" type="text/css"/>
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimuss/code/css/animate.css" type="text/css"/>
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimuss/code/css/cui-styleguide.min.css" type="text/css"/>
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimuss/code/css/atom-one-light.css" type="text/css"/>
        <link rel="icon" href="/static/img/favicon.png" type="image/x-icon"/>
        <script async src="https://www.google-analytics.com/gtag/js?id=UA-160598460-1"></script>
        <script>
            window.dataLayer = window.dataLayer || [];
            function gtag() {
                dataLayer.push(arguments);
            }
            gtag("js", new Date());
            gtag("config", "UA-160598460-1");
        </script>
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimuss/code/css/frontpage.css" type="text/css"/>
        <link rel="icon" type="image/vnd.microsoft.icon" href="/www.cisco.com/favicon.ico"/>
        <link rel="shortcut icon" type="image/vnd.microsoft.icon" href="/www.cisco.com/favicon.ico"/>
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimuss/code/css/SoftwareConfig.css" type="text/css"/>
    </head>
    <body>
        <div>
            Click on different features to see the basic configuration</div>
        <div>
            <div>
                <div>
                    <div>
                        <div>
                            <div>
                                <div>
                                    <div>
                                        <div>
                                            <div>
                                                <div>
                                                    <div>
                                                        <div>
                                                            <div>
                                                                <div>
                                                                    <div>
                                                                        <div>
                                                                            <div>
                                                                                <div>
                                                                                    <div>
                                                                                        <div>
                                                                                            <div>
                                                                                                <div>
                                                                                                    <div>
                                                                                                        <div>
                                                                                                            <div>
                                                                                                                <div>
                                                                                                                    <div>
                                                                                                                        <div>
                                                                                                                            <div>
                                                                                                                                <div>
                                                                                                                                    <div>
                                                                ................................................................

```

Fig: 5.1.1.1 Basic Configuration



```

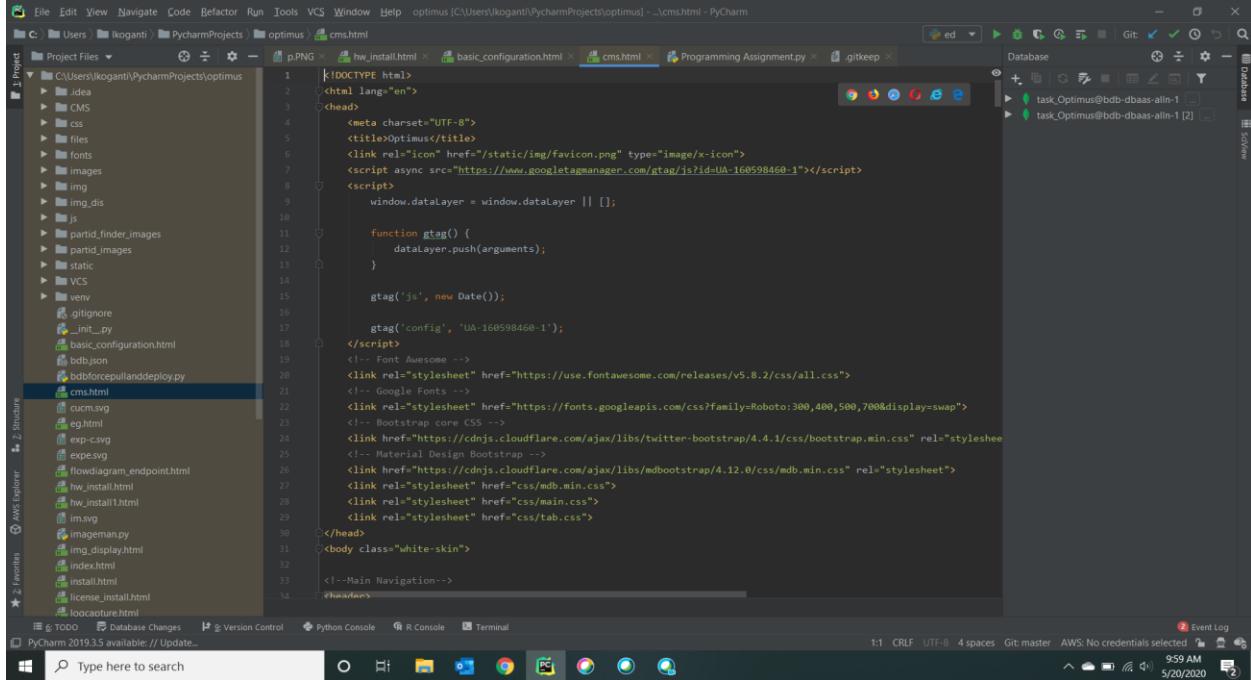
<html lang="en" class="no-js" xmlns="http://www.w3.org/1999/xhtml">
    <head>
        <body>
            <div>
                <div>
                    <div>
                        <div>
                            <div>
                                <div>
                                    <div>
                                        <div>
                                            <div>
                                                <div>
                                                    <div>
................................................................

```

Fig: 5.1.1.2 Basic Configuration

5.1.2 CMS:

CMS stands for Cisco Meeting Server. In this page the basic installation of CMS is displayed along with other modules like basic configuration, log capture and license installation.

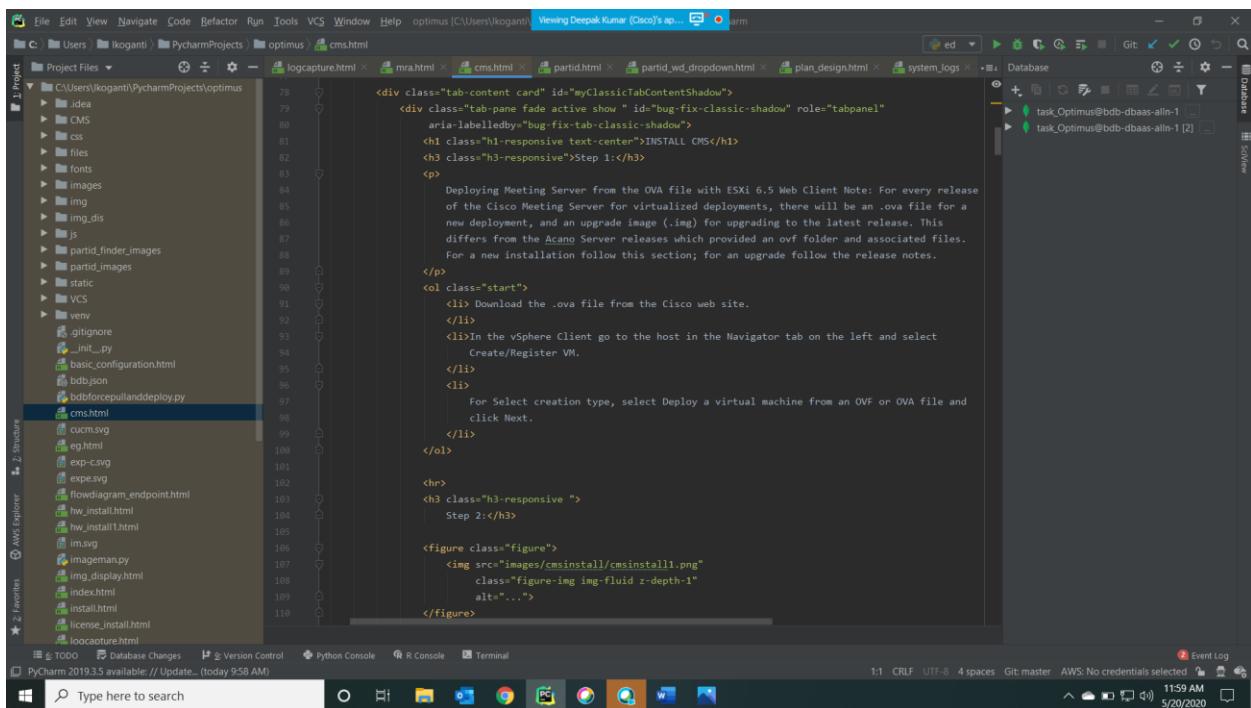


```

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Optimus</title>
    <link rel="icon" href="/static/img/favicon.png" type="image/x-icon">
    <script async src="https://www.googletagmanager.com/gtag/js?id=UA-160598460-1"></script>
    <script>
        window.dataLayer = window.dataLayer || [];
    </script>
    <function gtag() {
        dataLayer.push(arguments);
    }
    gtag('js', new Date());
    gtag('config', 'UA-160598460-1');
    </script>
    <!-- Font Awesome -->
    <link rel="stylesheet" href="https://use.fontawesome.com/releases/v5.8.2/css/all.css">
    <!-- Google Fonts -->
    <link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Roboto:300,400,500,700&display=sans">
    <!-- Bootstrap core CSS -->
    <link href="https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/4.4.1/css/bootstrap.min.css" rel="stylesheet">
    <!-- Material Design Bootstrap -->
    <link href="https://cdnjs.cloudflare.com/ajax/libs/mdbootstrap/4.12.0/css/mdb.min.css" rel="stylesheet">
    <link rel="stylesheet" href="css/main.css">
    <link rel="stylesheet" href="css/tab.css">
</head>
<body class="white-skin">
    <!-- Main Navigation-->
    <div>
        ...
    </div>
</body>

```

Fig: 5.1.2.1 CMS



```

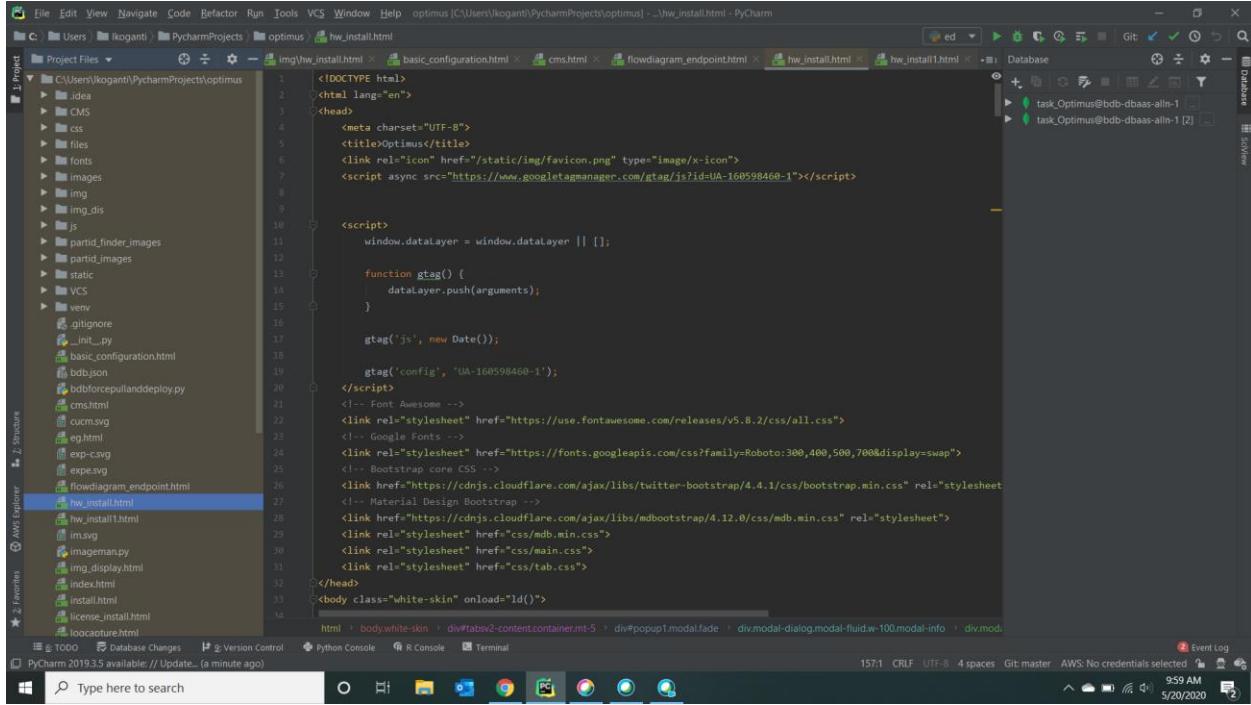
<div class="tab-content card" id="myClassicTabContentShadow">
    <div class="pane fade active show" id="bug-fix-classic-shadow" role="tabpanel"
        aria-labelledby="bug-fix-tab-classic-shadow">
        <h1 class="h1-responsive text-center">INSTALL CMS</h1>
        <h3 class="h3-responsive">Step 1:</h3>
        <p>
            Deploying Meeting Server from the OVA file with ESXi 6.5 Web Client Note: For every release of the Cisco Meeting Server for virtualized deployments, there will be an .ova file for a new deployment, and an upgrade image (.img) for upgrading to the latest release. This differs from the Acana Server releases which provided an ovf folder and associated files. For a new installation follow this section; for an upgrade follow the release notes.
        </p>
        <ol class="start">
            <li> Download the .ova file from the Cisco web site.
            </li>
            <li> In the vSphere Client go to the host in the Navigator tab on the left and select Create/Register VM.
            </li>
            <li>
                For Select creation type, select Deploy a virtual machine from an OVF or OVA file and click Next.
            </li>
        </ol>
        <br>
        <h3 class="h3-responsive "> Step 2:</h3>
        <figure class="figure">
            
        </figure>
    </div>
</div>

```

Fig: 5.1.2.2 CMS

5.1.3 Hardware Install:

This page is a follow up for the hardware installation page for each of the endpoints of the installation module. It contains different features like camera, touch10, display, mic, presentation, factory reset and documentation.



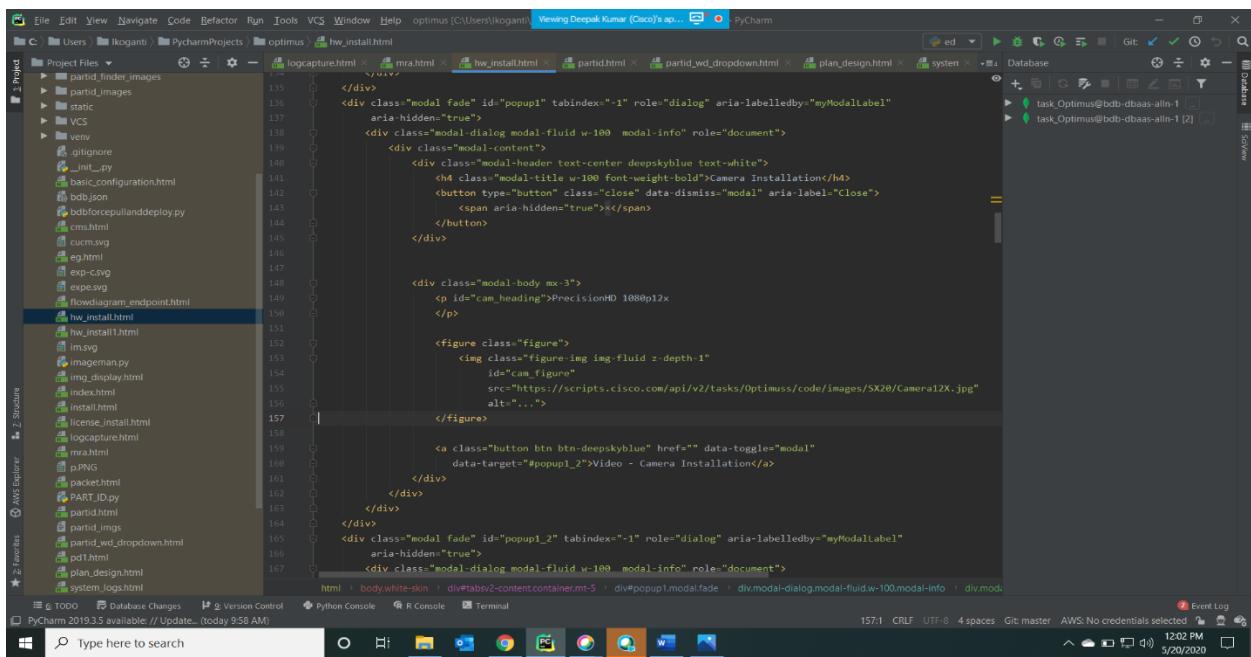
```

<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8">
    <title>Optimus</title>
    <link rel="icon" href="/static/img/Favicon.png" type="image/x-icon">
    <script async src="https://www.googletagmanager.com/gtag/js?id=UA-160598460-1"></script>

    <script>
      window.dataLayer = window.dataLayer || [];
      function gtag() {
        dataLayer.push(arguments);
      }
      gtag('js', new Date());
      gtag('config', 'UA-160598460-1');
    </script>
    <!-- Font Awesome -->
    <link rel="stylesheet" href="https://use.fontawesome.com/releases/v5.8.2/css/all.css">
    <!-- Google Fonts -->
    <link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Roboto:300,400,500,700&display=swap">
    <!-- Bootstrap core CSS -->
    <link href="https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/4.4.1/css/bootstrap.min.css" rel="stylesheet">
    <!-- Material Design Bootstrap -->
    <link href="https://cdnjs.cloudflare.com/ajax/libs/mdbootstrap/4.12.0/css/mdb.min.css" rel="stylesheet">
    <link rel="stylesheet" href="css/main.css">
    <link rel="stylesheet" href="css/tab.css">
  </head>
  <body class="white-skin" onload="ld()">

```

Fig: 5.1.3.1 Hardware Install



```

<div class="modal fade" id="popup1" tabindex="-1" role="dialog" aria-labelledby="myModalLabel" aria-hidden="true">
  <div class="modal-dialog modal-fluid w-100 modal-info" role="document">
    <div class="modal-content">
      <div class="modal-header text-center deepskyblue text-white">
        <h4 class="modal-title w-100 font-weight-bold">Camera Installation</h4>
        <button type="button" class="close" data-dismiss="modal" aria-label="Close">
          <span aria-hidden="true">&amptimes</span>
        </button>
      </div>
      <div class="modal-body mx-3">
        <p id="cam_heading">PrecisionHD 1080p12x</p>
        <figure class="figure">
          
        </figure>
        <a class="button btn btn-deepskyblue" href="#" data-toggle="modal" data-target="#popup1_2">Video - Camera Installation</a>
      </div>
    </div>
  </div>
<div class="modal fade" id="popup1_2" tabindex="-1" role="dialog" aria-labelledby="myModalLabel" aria-hidden="true">
  <div class="modal-dialog modal-fluid w-100 modal-info" role="document">

```

Fig: 5.1.3.1 Hardware Install

5.1.4 Index:

Index page is the main home page for the project of Optimus_DDUCT. This page includes a slideshow of different modules for ease of access also.

```

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Optimus</title>
    <link rel="icon" href="/static/img/favicon.png" type="image/x-icon">
    <script async src="https://www.googletagmanager.com/gtag/js?id=UA-160598460-1"></script>
    <script>
        window.dataLayer = window.dataLayer || [];
        function gtag() {
            dataLayer.push(arguments);
        }
        gtag('js', new Date());
        gtag('config', 'UA-160598460-1');
    </script>
    <!-- Font Awesome -->
    <link rel="stylesheet" href="https://use.fontawesome.com/releases/v5.8.2/css/all.css">
    <!-- Google Fonts -->
    <link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Roboto:300,400,500,700&display=swap">
    <!-- Bootstrap core CSS -->
    <link href="https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/4.4.1/css/bootstrap.min.css" rel="stylesheet"
    <!-- Material Design Bootstrap -->
    <link href="https://cdnjs.cloudflare.com/ajax/libs/mdbbootstrap/4.12.0/css/mdb.min.css" rel="stylesheet">

    <link rel="stylesheet" href="css/mdb.min.css">
    <link rel="stylesheet" href="css/tab.css">
    <link rel="stylesheet" href="css/main.css">
</head>
<body class="white-skin">
    ...
</body>

```

Fig: 5.1.4.1 Index

```

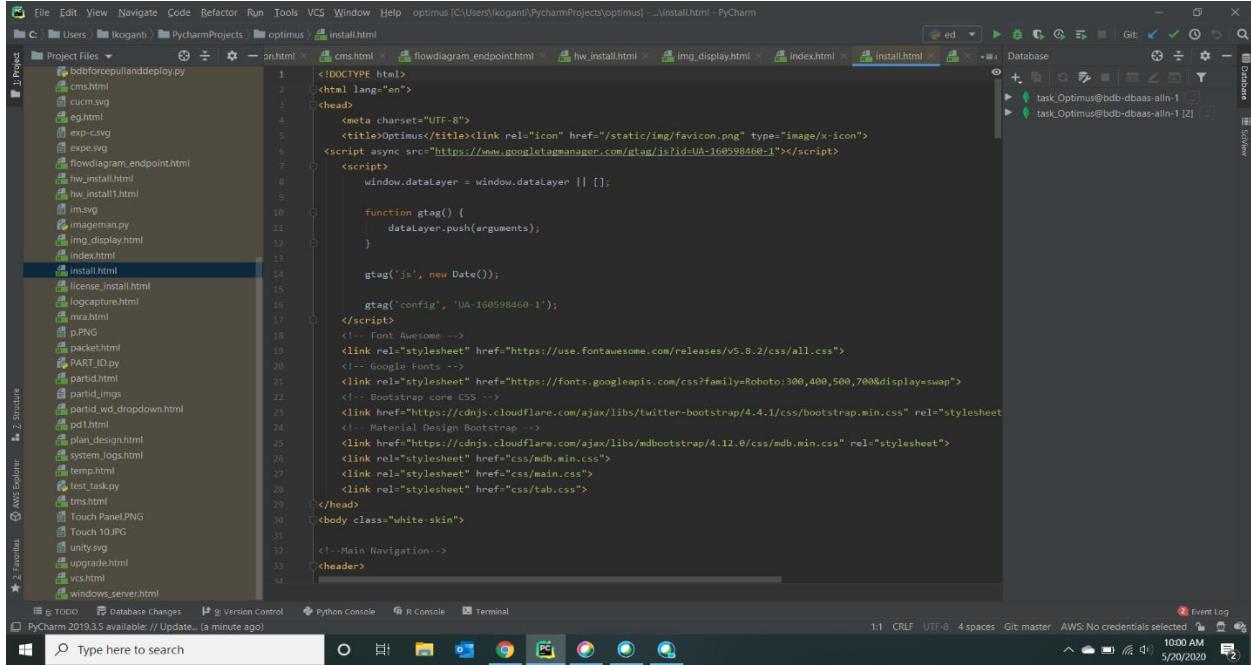
<main class="mt-5">
    <!--Main container-->
    <div class="container">
        <div id="maincarousel" class="carousel slide" data-ride="carousel">
            <ol class="carousel-indicators">
                <li data-target="#maincarousel" data-slide-to="0" class="active"></li>
                <li data-target="#maincarousel" data-slide-to="1"></li>
                <li data-target="#maincarousel" data-slide-to="2"></li>
                <li data-target="#maincarousel" data-slide-to="3"></li>
                <li data-target="#maincarousel" data-slide-to="4"></li>
                <li data-target="#maincarousel" data-slide-to="5"></li>
            </ol>
            <div class="carousel-inner">
                <div class="carousel-item active">
                    <div class="view">
                        
                        <div class="mask flex-center rgba-black-strong">
                            <h1 class="white-text">Install Components</h1>
                        </div>
                        <div class="carousel-caption d-none d-md-block">
                            <button type="button" class="btn btn-rounded deepskyblue" data-toggle="modal"
                                data-target="#fluidModalBottomDangerDemo">Install Now
                            </button>
                        </div>
                    </div>
                </div>
            </div>
        </div>
    </div>

```

Fig: 5.1.4.2 Index

5.1.5 Install:

Install page is none other than the module of Installation page. This contains different sub modules like 360° view, basic configuration, hardware installation, log capture, license installation.



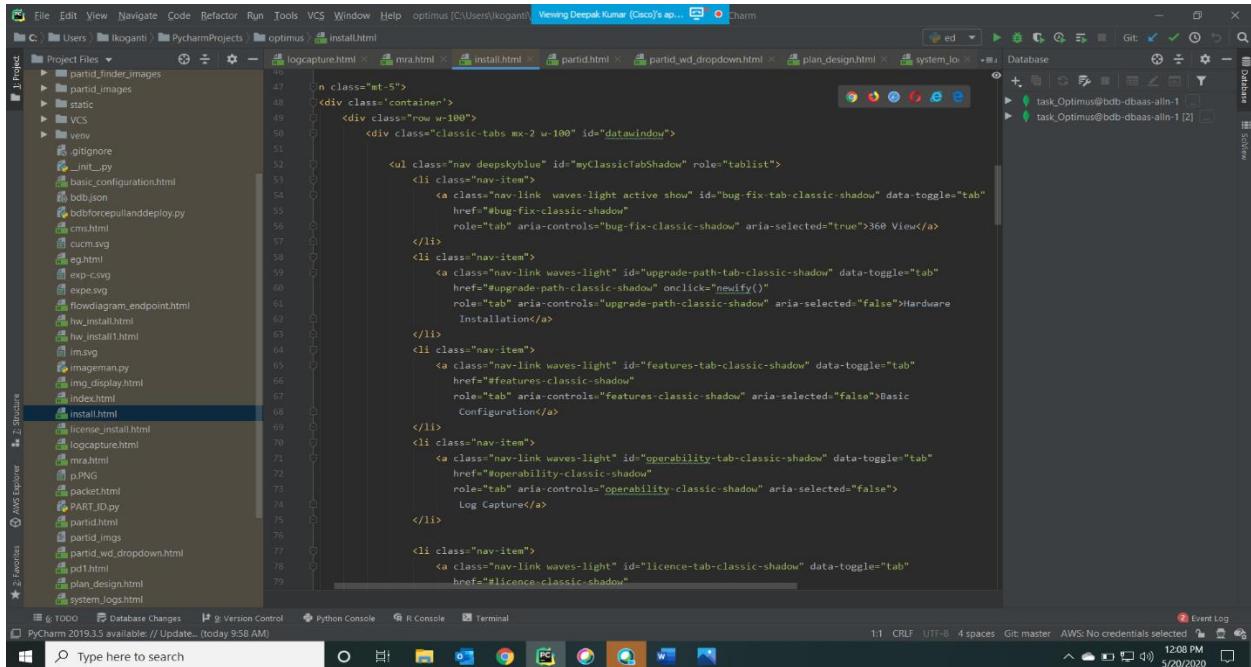
The screenshot shows the PyCharm IDE interface with the 'install.html' file open in the editor. The code is an HTML file with some JavaScript and CSS imports. The code includes a head section with meta tags, a script block for Google Analytics, and a body section with a header and main navigation. The PyCharm interface includes toolbars, a sidebar with project files, and a bottom status bar showing the date and time.

```

<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8">
    <title>Optimus</title><link rel="icon" href="/static/img/favicon.png" type="image/x-icon">
    <script async src="https://www.google-analytics.com/gtag/js?id=UA-160598460-1"></script>
    <script>
      window.dataLayer = window.dataLayer || [];
      function gtag() {
        dataLayer.push(arguments);
      }
      gtag('js', new Date());
      gtag('config', 'UA-160598460-1');
    </script>
    <!-- Font Awesome -->
    <link rel="stylesheet" href="https://use.fontawesome.com/releases/v5.0.13/css/all.css">
    <!-- Google Fonts -->
    <link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Roboto:300,400,500,700&display=sans-serif">
    <!-- Bootstrap core CSS -->
    <link href="https://cdn.jsdelivr.net/npm/twbs/bootstrap@4.4.1/dist/css/bootstrap.min.css" rel="stylesheet">
    <!-- Material Design Bootstrap -->
    <link href="https://cdn.jsdelivr.net/npm/mdbbootstrap@4.12.0/dist/css/mdb.min.css" rel="stylesheet">
    <link rel="stylesheet" href="css/main.css">
    <link rel="stylesheet" href="css/tab.css">
  </head>
  <body class="white-skin">
    <!-- Main Navigation -->
    <header>

```

Fig: 5.1.5.1 Install



The screenshot shows the PyCharm IDE interface with the 'install.html' file open in the editor. The code is an HTML file with a complex navigation menu using tabs and sub-tabs. The menu items include '360 View', 'Hardware Installation', 'Basic Configuration', 'Log Capture', and 'Operability'. The PyCharm interface includes toolbars, a sidebar with project files, and a bottom status bar showing the date and time.

```

<ul class="nav deepskyblue" id="myClassicTabShadow" role="tablist">
  <li class="nav-item">
    <a class="nav-link waves-light active show" id="bug-fix-tab-classic-shadow" data-toggle="tab"
       href="#bug-fix-classic-shadow"
       role="tab" aria-controls="bug-fix-classic-shadow" aria-selected="true">360 View</a>
  </li>
  <li class="nav-item">
    <a class="nav-link waves-light" id="upgrade-path-tab-classic-shadow" data-toggle="tab"
       href="#upgrade-path-classic-shadow" onclick="notify()">Hardware
      Installation</a>
  </li>
  <li class="nav-item">
    <a class="nav-link waves-light" id="features-tab-classic-shadow" data-toggle="tab"
       href="#features-classic-shadow"
       role="tab" aria-controls="features-classic-shadow" aria-selected="false">Basic
      Configuration</a>
  </li>
  <li class="nav-item">
    <a class="nav-link waves-light" id="operability-tab-classic-shadow" data-toggle="tab"
       href="#operability-classic-shadow"
       role="tab" aria-controls="operability-classic-shadow" aria-selected="false">Operability
      Log Capture</a>
  </li>
  <li class="nav-item">
    <a class="nav-link waves-light" id="licence-tab-classic-shadow" data-toggle="tab"
       href="#licence-classic-shadow">Licence</a>
  </li>

```

Fig: 5.1.5.1 Install

5.1.6 License install:

License install is one of the modules of installation, CMS and VCS. It shows a step by step procedure for adding optional keys through web interface by the means of pictures.

The screenshot shows the PyCharm IDE interface. The code editor on the right displays a JSON configuration file for a web application, specifically for user authentication and system settings. The file includes sections for users, notifications, pages, security (password policy), and a system section. The left panel shows the project structure under 'Project Files' and a file browser with various files listed. The bottom navigation bar includes tabs for 'File', 'Edit', 'View', 'Navigate', 'Code', 'Refactor', 'Run', 'Tools', 'VCS', 'Window', and 'Help'. The status bar at the bottom shows the current file as 'optimus [C:\Users\ikoganti\PycharmProjects\optimus\license_install.html]' and the version as 'PyCharm 2019.3.5'.

```
File Edit View Navigate Code Refactor Run Tools VCS Window Help optimus [C:\Users\ikoganti\PycharmProjects\optimus\license_install.html] - Python Console - Database - Git - Event Log
```

```
Project Files
  - partid_finder_images
  - partid_images
  - static
  - VCS
  - venv
    - __init__.py
    - basic_configuration.html
    - bob.json
    - bdbforecuperllanddeploy.py
    - cms.html
    - cucm.svg
    - eg.html
    - exp-csv
    - exp.svg
    - flowdiagram_endpoint.html
    - hw_install.html
    - nw_install.html
    - nw_install.html
    - im.svg
    - imageman.py
    - img_display.html
    - index.html
    - install.html
    - license_install.html
    - logcapture.html
    - mra.html
    - p.PNG
    - packet.html
    - PART_ID.py
    - partid.html
    - partid_imgs
    - partid_wd_dropdown.html
    - pdt.html
    - plan_design.html
    - system_logs.html

  - html
    - partid_wd_dropdown.html
    - plan_design.html
    - system_logs.html
    - tms.html
    - upgrade.html
    - license_install.html

  - Database
    - task_Optimus@bdb-dbaas-alln-1 [1]
    - task_Optimus@bdb-dbaas-alln-1 [2]

  - Event Log
```

```
File: C:\Users\ikoganti\PycharmProjects\optimus\license_install.html
 82     "name": "admin",
 83     "icon": "icon-user",
 84     "class": "current-user",
 85     "children": [{"type": "item", "link": "\web\signin\signout"}, {
 86         "type": "item",
 87         "link": "\web\change-passphrase"
 88     }]
 89 },
 90 "notifications": [],
 91 "page": {
 92     "error": null,
 93     "showCallInfo": true,
 94     "systemTitle": "Palak Codec's",
 95     "csrfToken": "929042dc06f7d2e9261daa5e792ee6b17f6af8397b47927b99e914687c98d2fc"
 96 },
 97 "security": {
 98     "password_policy": {
 99         "MinimumDigits": 6,
100         "MinimumLength": 6,
101         "MinimumLowercase": 0,
102         "MinimumSpecial": 0,
103         "MinimumUppercase": 0
104     }
105 },
106 "system": {
107     "connected": true,
108     "language": "en_US",
109     "name": "Palak Codec's",
110     "product": "Cisco Webex Codec Plus",
111     "showBrand": true,
112     "wallpaperSize": [3840, 2160],
113     "testSoftware": false
114 },
115 "use": {"username": "admin", "roles": ["USER", "LOCAL", "ADMIN", "AUDIT"]},
```

Fig: 5.1.6.1 License Install

The screenshot shows the PyCharm IDE interface. The top navigation bar includes File, Edit, View, Navigate, Code, Refactor, Run, Tools, VCS, Window, Help, and optimus (C:/Users/ikogant). The main window displays a code editor with a JSON-like configuration file. The left sidebar shows a project tree with various files and folders. The bottom navigation bar includes tabs for TODO, Database Changes, Version Control, Python Console, R Console, Terminal, and Event Log. A search bar at the bottom allows for searching through the code.

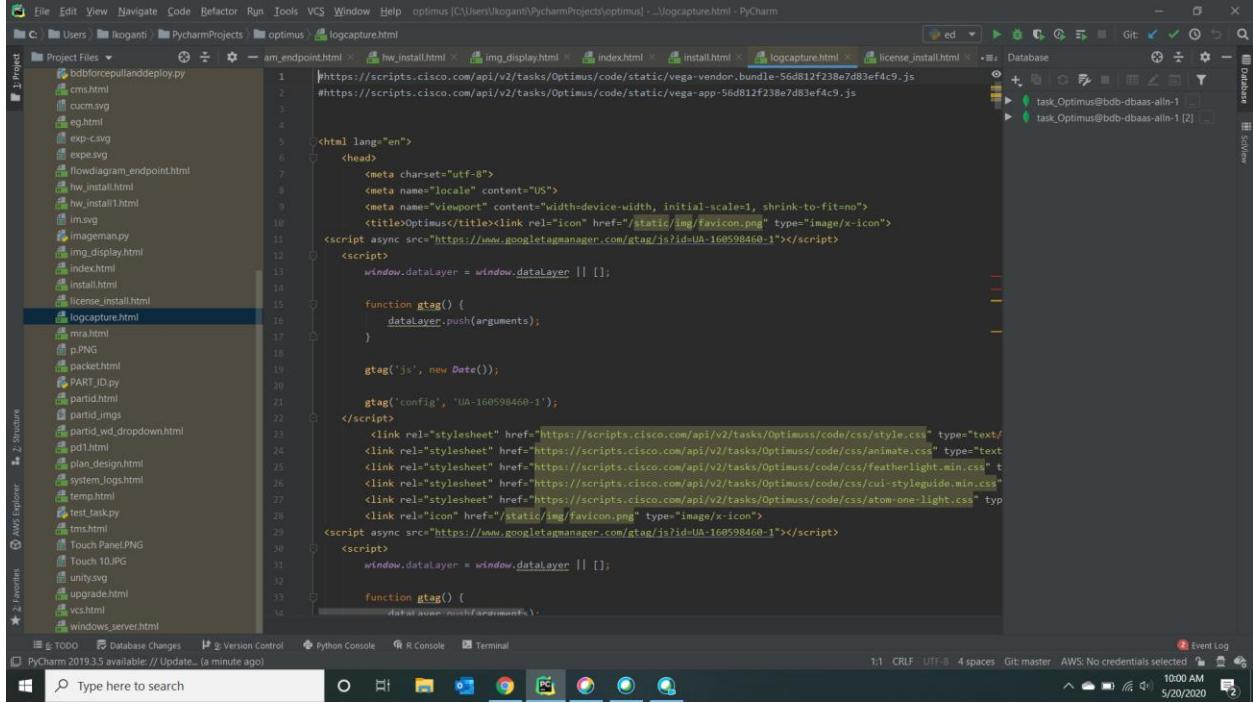
```
File Edit View Navigate Code Refactor Run Tools VCS Window Help optimus (C:/Users/ikogant) Viewing Deepak Kumar (Cisco's) ap... imj - PyCharm  
C:\Users\ikogant\PycharmProjects\optimus\license_install.html  
Project Files ▾  html ▾ partid_wd_dropdown.html ▾ plan_design.html ▾ system_logs.html ▾ tms.html ▾ upgrade.html ▾ license_install.html Database  
partid_finder_images  
partid_images  
static  
VCS  
venv  
.gitignore  
__init__.py  
basic_configuration.html  
bdd.json  
bddorcepullanddeploy.py  
cms.html  
cucm.svg  
eg.html  
exp-csv  
expes.svg  
flowdiagram_endpoint.html  
hw_install.html  
hw_install1.html  
im.svg  
imageman.py  
img_display.html  
index.html  
install.html  
license_install.html  
logcapture.html  
mra.html  
p.PNG  

```

Fig: 5.1.6.1 License Install

5.1.7 Log Capture:

Log capture module is similar to hardware installation module I display but this module deals with system logs unlike hardware installation.

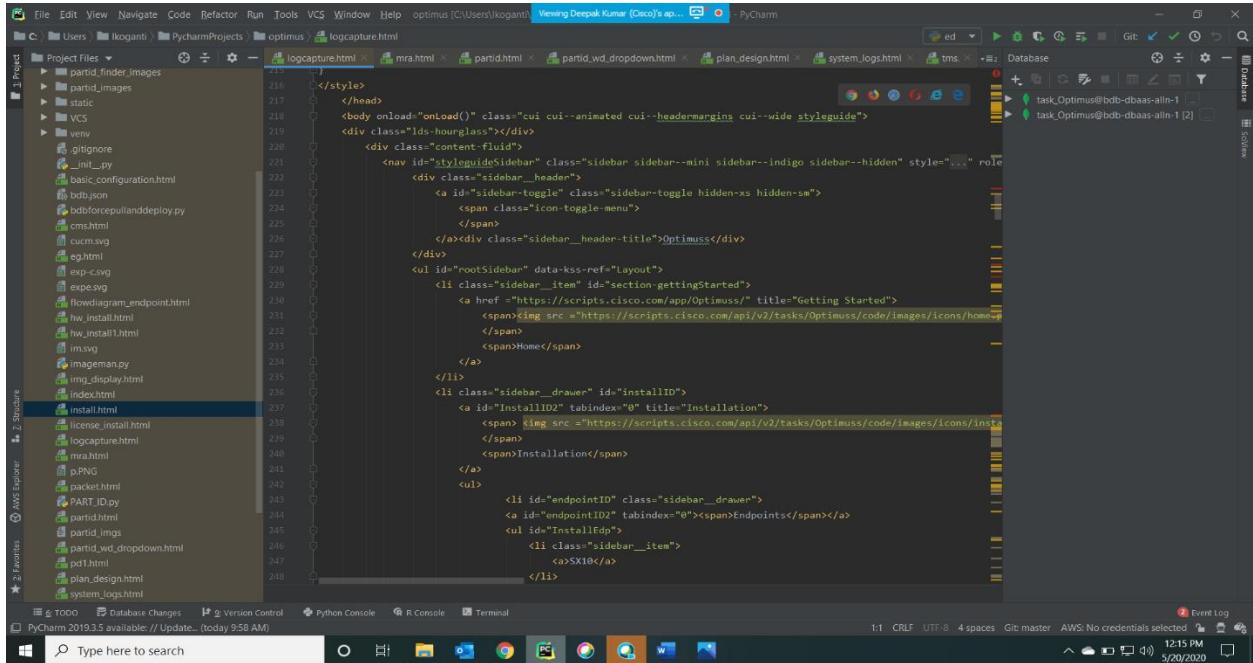


```

<html lang="en">
    <head>
        <meta charset="utf-8">
        <meta name="locale" content="US">
        <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
        <title>Optimus</title><link rel="icon" href="static/img/favicon.png" type="image/x-icon">
        <script async src="https://www.googletagmanager.com/gtag/js?id=UA-160598460-1"></script>
        <script>
            window.dataLayer = window.dataLayer || [];
            function gtag() {
                dataLayer.push(arguments);
            }
            gtag('js', new Date());
            gtag('config', 'UA-160598460-1');
        </script>
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimus/code/css/style.css" type="text/css">
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimus/code/css/animate.css" type="text/css">
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimus/code/css/featherlight.min.css" type="text/css">
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimus/code/css/cui-styleguide.min.css" type="text/css">
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimus/code/css/stomp-one-light.css" type="text/css">
        <link rel="icon" href="static/img/favicon.png" type="image/x-icon">
        <script async src="https://www.googletagmanager.com/gtag/js?id=UA-160598460-1"></script>
        <script>
            window.dataLayer = window.dataLayer || [];
            function gtag() {
                dataLayer.push(arguments);
            }
        </script>
    </head>
    <body>
        <div class="lds-hourglass"></div>
        <div class="content-fluid">
            <nav id="styleguideSidebar" class="sidebar sidebar--mini sidebar--indigo sidebar--hidden" style="...>
                <div class="sidebar__header">
                    <a id="sidebar-toggle" class="sidebar__toggle hidden-xs hidden-sm">
                        <span class="icon__toggle-menu"></span>
                    </a>
                    <div class="sidebar__header-title">Optimus</div>
                </div>
                <ul id="rootSidebar" data-kss-ref="Layout">
                    <li class="sidebar__item" id="section-gettingStarted">
                        <a href="https://scripts.cisco.com/app/Optimus/" title="Getting Started">
                            <span></span>
                            <span>Home</span>
                        </a>
                    </li>
                    <li class="sidebar__drawer" id="installID">
                        <a id="InstallID2" tabindex="0" title="Installation">
                            <span></span>
                            <span>Installation</span>
                        </a>
                    <ul>
                        <li id="endpointID" class="sidebar__drawer">
                            <a id="endpointID2" tabindex="0" title="Endpoints">
                                <span>Endpoints</span>
                            </a>
                        <ul id="InstallIDip">
                            <li class="sidebar__item">
                                <a href="#" title="SXI0">SXI0</a>
                            </li>
                        </ul>
                    </ul>
                </li>
            </ul>
        </div>
    </body>
</html>

```

Fig: 5.1.7.1 Log Capture



```

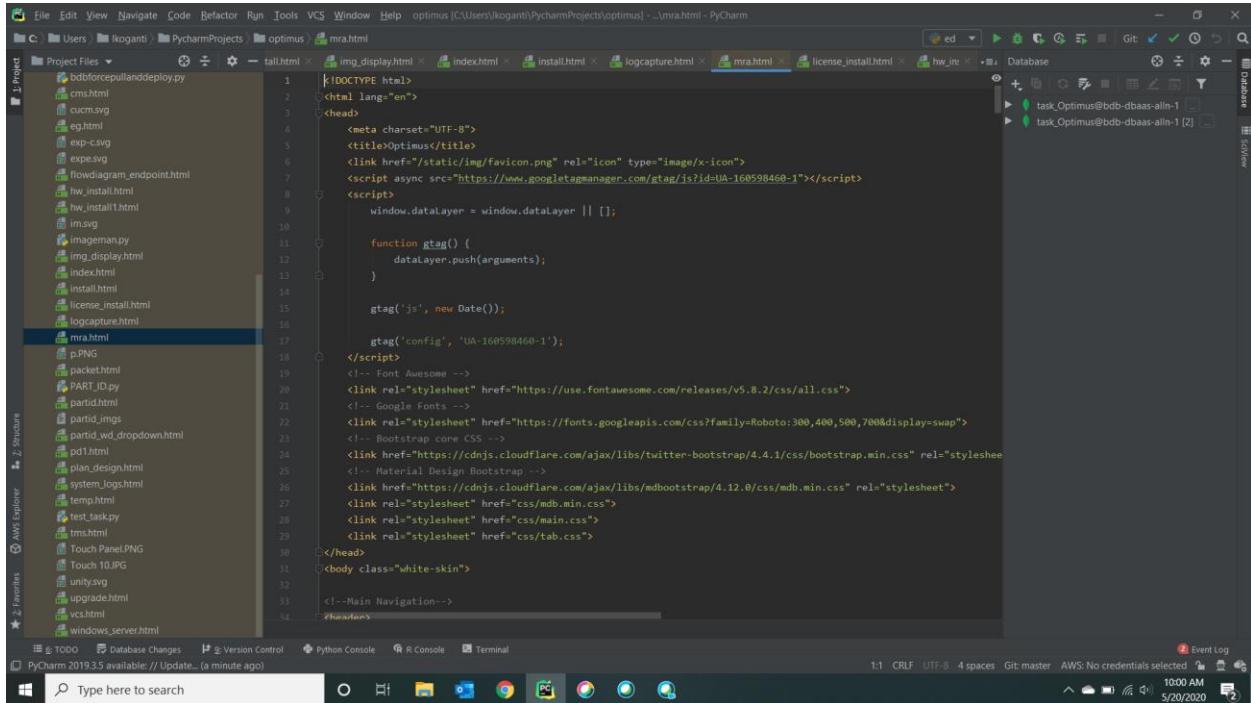
<html lang="en">
    <head>
        <meta charset="utf-8">
        <meta name="locale" content="US">
        <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
        <title>Optimus</title><link rel="icon" href="static/img/favicon.png" type="image/x-icon">
        <script async src="https://www.googletagmanager.com/gtag/js?id=UA-160598460-1"></script>
        <script>
            window.dataLayer = window.dataLayer || [];
            function gtag() {
                dataLayer.push(arguments);
            }
            gtag('js', new Date());
            gtag('config', 'UA-160598460-1');
        </script>
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimus/code/css/style.css" type="text/css">
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimus/code/css/animate.css" type="text/css">
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimus/code/css/featherlight.min.css" type="text/css">
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimus/code/css/cui-styleguide.min.css" type="text/css">
        <link rel="stylesheet" href="https://scripts.cisco.com/api/v2/tasks/Optimus/code/css/stomp-one-light.css" type="text/css">
        <link rel="icon" href="static/img/favicon.png" type="image/x-icon">
        <script async src="https://www.googletagmanager.com/gtag/js?id=UA-160598460-1"></script>
        <script>
            window.dataLayer = window.dataLayer || [];
            function gtag() {
                dataLayer.push(arguments);
            }
        </script>
    </head>
    <body>
        <div class="lds-hourglass"></div>
        <div class="content-fluid">
            <nav id="styleguideSidebar" class="sidebar sidebar--mini sidebar--indigo sidebar--hidden" style="...>
                <div class="sidebar__header">
                    <a id="sidebar-toggle" class="sidebar__toggle hidden-xs hidden-sm">
                        <span class="icon__toggle-menu"></span>
                    </a>
                    <div class="sidebar__header-title">Optimus</div>
                </div>
                <ul id="rootSidebar" data-kss-ref="Layout">
                    <li class="sidebar__item" id="section-gettingStarted">
                        <a href="https://scripts.cisco.com/app/Optimus/" title="Getting Started">
                            <span></span>
                            <span>Home</span>
                        </a>
                    </li>
                    <li class="sidebar__drawer" id="installID">
                        <a id="InstallID2" tabindex="0" title="Installation">
                            <span></span>
                            <span>Installation</span>
                        </a>
                    <ul>
                        <li id="endpointID" class="sidebar__drawer">
                            <a id="endpointID2" tabindex="0" title="Endpoints">
                                <span>Endpoints</span>
                            </a>
                        <ul id="InstallIDip">
                            <li class="sidebar__item">
                                <a href="#" title="SXI0">SXI0</a>
                            </li>
                        </ul>
                    </ul>
                </li>
            </ul>
        </div>
    </body>
</html>

```

Fig: 5.1.7.2 License Install

5.1.8 MRA:

The MRA page which is nothing but the internal loop of config validator module deals with Call Control-VCS. This page has different sub modules like Expressway-C, Expressway-E, Certificates, Port range, Troubleshoot.

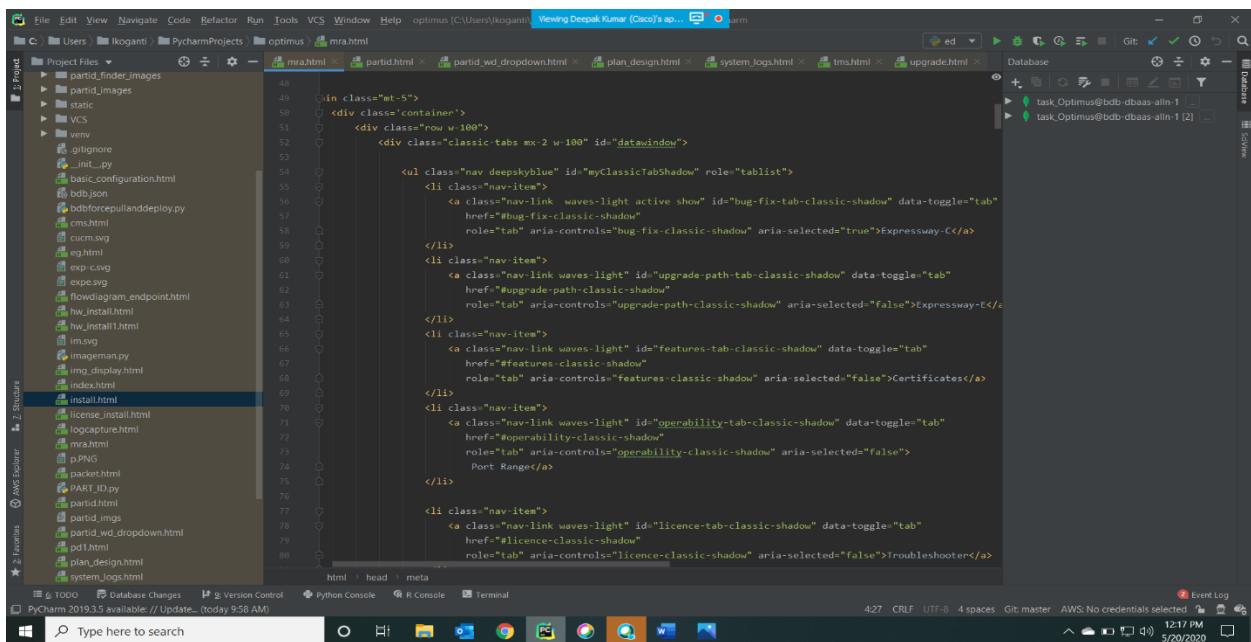


```

<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8">
    <title>Optimus</title>
    <link href="/static/img/favicon.png" rel="icon" type="image/x-icon">
    <script async src="https://www.googletagmanager.com/gtag/js?id=UA-160598460-1"></script>
    <script>
      window.dataLayer = window.dataLayer || [];
      function gtag() {
        dataLayer.push(arguments);
      }
      gtag('js', new Date());
      gtag('config', 'UA-160598460-1');
    </script>
    <!-- Font Awesome -->
    <link rel="stylesheet" href="https://use.fontawesome.com/releases/v5.8.2/css/all.css">
    <!-- Google Fonts -->
    <link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Roboto:300,400,500,700&display=swap">
    <!-- Bootstrap core CSS -->
    <link href="https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/4.4.1/css/bootstrap.min.css" rel="stylesheet">
    <!-- Material Design Bootstrap -->
    <link href="https://cdnjs.cloudflare.com/ajax/libs/mdbootstrap/4.12.0/css/mdb.min.css" rel="stylesheet">
    <link rel="stylesheet" href="css/mdb.min.css">
    <link rel="stylesheet" href="css/main.css">
    <link rel="stylesheet" href="css/tab.css">
  </head>
  <body class="white-skin">
    <!-- Main Navigation-->
    <nav>

```

Fig: 5.1.8.1 MRA



```

<in class="mt-5">
  <div class="container">
    <div class="row w-100">
      <div class="classic-tabs mx-2 w-100" id="datawindow">
        <ul class="nav deepskyblue" id="myclassicTabShadow" role="tablist">
          <li class="nav-item">
            <a class="nav-link waves-light active show" id="bug-fix-tab-classic-shadow" data-toggle="tab"
               href="#bug-fix-classic-shadow"
               roles="tab" aria-controls="bug-fix-classic-shadow" aria-selected="true">Expressway-C</a>
          </li>
          <li class="nav-item">
            <a class="nav-link waves-light" id="upgrade-path-tab-classic-shadow" data-toggle="tab"
               href="#upgrade-path-classic-shadow"
               roles="tab" aria-controls="upgrade-path-classic-shadow" aria-selected="false">Expressway-E</a>
          </li>
          <li class="nav-item">
            <a class="nav-link waves-light" id="features-tab-classic-shadow" data-toggle="tab"
               href="#features-classic-shadow"
               roles="tab" aria-controls="features-classic-shadow" aria-selected="false">Certificates</a>
          </li>
          <li class="nav-item">
            <a class="nav-link waves-light" id="operability-tab-classic-shadow" data-toggle="tab"
               href="#operability-classic-shadow"
               roles="tab" aria-controls="operability-classic-shadow" aria-selected="false">Port Range</a>
          </li>
          <li class="nav-item">
            <a class="nav-link waves-light" id="licence-tab-classic-shadow" data-toggle="tab"
               href="#licence-classic-shadow"
               roles="tab" aria-controls="licence-classic-shadow" aria-selected="false">Troubleshooter</a>
          </li>
        </ul>
      </div>
    </div>
  </div>

```

Fig: 5.1.8.2 MRA

5.1.9 PartID:

PartID module has 2 other sub modules named, PartId Finder and Warranty Check. In the first sub module internal looping has been used to display multiple codecs and it's type.

```

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Optimus</title>
    <link rel="icon" href="/static/img/favicon.png" type="image/x-icon">
    <script async src="https://www.googletagmanager.com/gtag/js?id=UA-160598460-1"></script>
    <script>
        window.dataLayer = window.dataLayer || [];
        function gtag() {
            dataLayer.push(arguments);
        }
        gtag('js', new Date());
        gtag('config', 'UA-160598460-1');
    </script>
    <!-- Font Awesome -->
    <link rel="stylesheet" href="https://use.fontawesome.com/releases/v5.8.2/css/all.css">
    <!-- Google Fonts -->
    <link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Roboto:300,400,500,700&display=swap">
    <!-- Bootstrap core CSS -->
    <link href="https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/4.4.1/css/bootstrap.min.css" rel="stylesheet">
    <!-- Material Design Bootstrap -->
    <link href="https://cdnjs.cloudflare.com/ajax/libs/mdbootstrap/4.12.0/css/mdb.min.css" rel="stylesheet">
    <link rel="stylesheet" href="css/mdb.css">
    <link rel="stylesheet" href="css/tab.css">
    <link rel="stylesheet" href="css/main.css">
</head>
<body class="white-skin">
    <!-- Main Navigation-->
    <header>

```

Fig: 5.1.9.1 PartID

```

<main class="mt-5">
    <!--Main container-->
    <div class="container">
        <div class="row w-100 mt-5">
            <div class="classic-tabs mx-2 w-100" id="datawindow">
                <ul class="nav deepskyblue" id="myClassicTabShadow" role="tablist">
                    <li class="nav-item">
                        <a class="nav-link waves-light active show" id="bug-fix-tab-classic-shadow" data-toggle="tab" href="#bug-fix-classic-shadow" role="tab" aria-controls="bug-fix-classic-shadow" aria-selected="true">Part Id Finder</a>
                    </li>
                    <li class="nav-item">
                        <a class="nav-link waves-light" id="upgrade-path-tab-classic-shadow" data-toggle="tab" href="#upgrade-path-classic-shadow" role="tab" aria-controls="upgrade-path-classic-shadow" aria-selected="false">Warranty Checker</a>
                    </li>
                </ul>
                <div class="tab-content card w-100" id="myClassicTabContentShadow">
                    <div class="tab-pane fade active show" id="bug-fix-classic-shadow" role="tabpanel" aria-labelledby="bug-fix-tab-classic-shadow">
                        <div class="row">
                            <div class="col-md-12" style="background-color: #f2f2f2; padding: 10px; border-radius: 5px; margin-bottom: 10px;">

```

Fig: 5.1.9.2 PartID

5.1.10 Plan Design:

Plan Design module is used for providing the customer to plan his/her own collab design. This contains multiple checkboxes named, MRA, B2B calls, Jabber guest, Register, and CMR cloud.

```

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Optimus</title>
    <link rel="icon" href="/static/img/favicon.png" type="image/x-icon">
    <script async src="https://www.googletagmanager.com/gtag/js?id=UA-160598460-1"></script>
    <script>
        window.dataLayer = window.dataLayer || [];
        function gtag() {
            dataLayer.push(arguments);
        }
        gtag('js', new Date());
        gtag('config', 'UA-160598460-1');
    </script>
    <!-- Font Awesome -->
    <link rel="stylesheet" href="https://use.fontawesome.com/releases/v5.8.2/css/all.css">
    <!-- Google Fonts -->
    <link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Roboto:300,400,500,700&display=swap">
    <!-- Bootstrap core CSS -->
    <link href="https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/4.4.1/css/bootstrap.min.css" rel="stylesheet">
    <!-- Material Design Bootstrap -->
    <link href="https://cdnjs.cloudflare.com/ajax/libs/mdbootstrap/4.12.0/css/mdb.min.css" rel="stylesheet">
    <link rel="stylesheet" href="css/addons/datatables.min.css" rel="stylesheet">
    <link rel="stylesheet" href="css/mdb.min.css">
    <link rel="stylesheet" href="css/tab.css">
    <link rel="stylesheet" href="css/main.css">
</head>
<body class="white-skin">
    <!-- Main Navigation -->
    <header>

```

Fig: 5.1.10.1 Plan Design

```

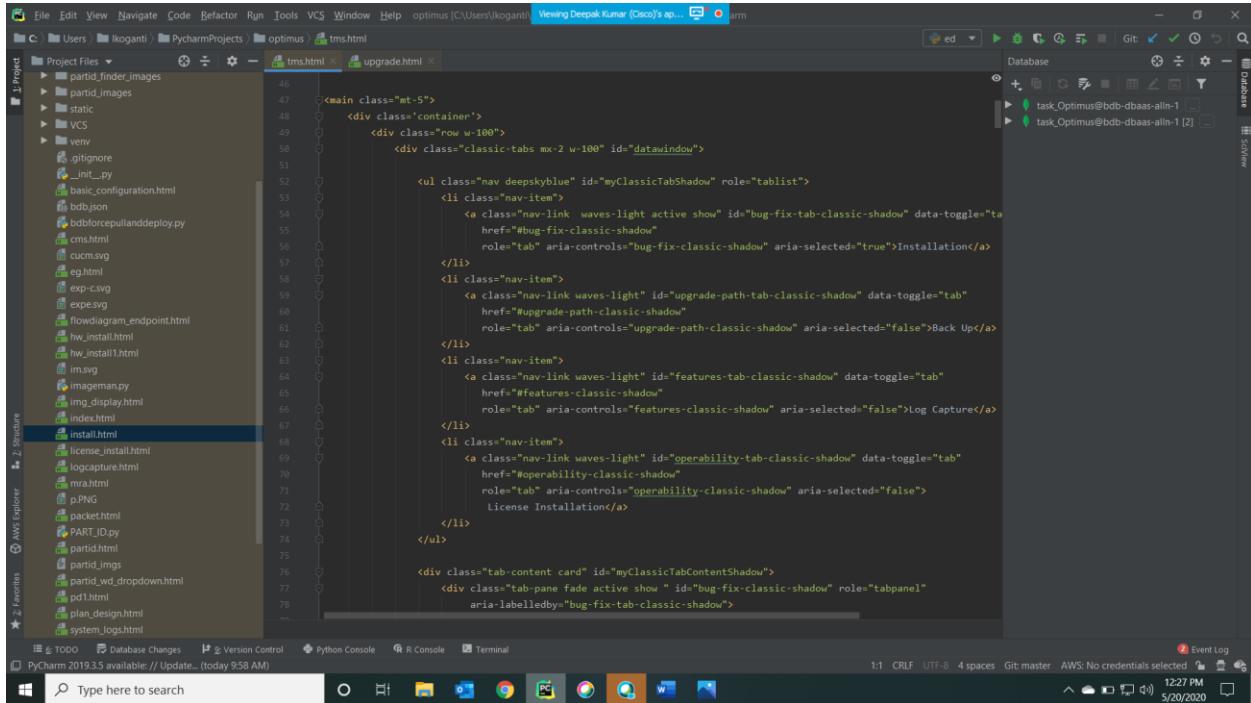
<!-- Main layout -->
<main class="mt-5">
    <!-- Default unchecked -->
    <div class="container">
        <!-- Material form register -->
        <div class="row justify-content-md-center">
            <div class="col col-lg-6 col-md-8 col-sm-12">
                <div class="card">
                    <h5 class="card-header info-color white-text text-center py-4">
                        <strong>Plan your Collab Design</strong>
                    </h5>
                    <!-- Card content -->
                    <div class="card-body px-lg-5 pt-5">
                        <!-- Form -->
                        <form class="text-center" style="..." action="#">
                            <!-- E-mail -->
                            <div class="form-row text-left">
                                <div class="col col-6">
                                    <div class="form-check">
                                        <input type="checkbox" class="form-check-input" id="vehicle1">
                                        <label class="form-check-label" for="vehicle1"> MRA </label>
                                    </div>
                                <div class="col col-6">

```

Fig: 5.1.10.2 Plan Design

5.1.11 TMS:

TMS stands for Cisco Telepresence Management Suite. This is a sub module of the Installation module. This internally has more sub modules named installation, back up, log capture, license installation.



```

File Edit View Navigate Code Refactor Run Tools VCS Window Help optimus (C:\Users\ikoganti) Viewing Deepak Kumar (Cisco)'s ap... arm
C:\Users\ikoganti\PycharmProjects\optimus\tms.html
Project Files
  - partid_finder_images
  - partid_images
  - static
  - VCS
  - venv
    - .gitignore
    - __init__.py
    - basic_configuration.html
    - bdb.json
    - bdbforcepullanddeploy.py
    - cms.html
    - cucm.svg
    - egi.html
    - exp-csv
    - exp-e
    - flowdiagram_endpoint.html
    - hw_install.html
    - hw_install1.html
    - im.svg
    - imageman.py
    - img_display.html
    - index.html
    - install.html
    - license_install.html
    - logcapture.html
    - mira.html
    - p.PNG
    - packet.html
    - PART_ID.py
    - partid.html
    - partid_imgs
    - partid_wd_dropdown.html
    - pdf.html
    - plan_design.html
    - system_logs.html
  - Structure
  - AWS Explorer
  - Favorites
  - Database
  - Event Log
  - TODO Database Changes Version Control Python Console R Console Terminal
  - PyCharm 2019.3.5 available // Update... (today 9:58 AM)
  - Type here to search
  - 1:1 CR LF UTF-8 4 spaces Git: master AWS: No credentials selected
  - 12:27 PM 5/20/2020

```

```

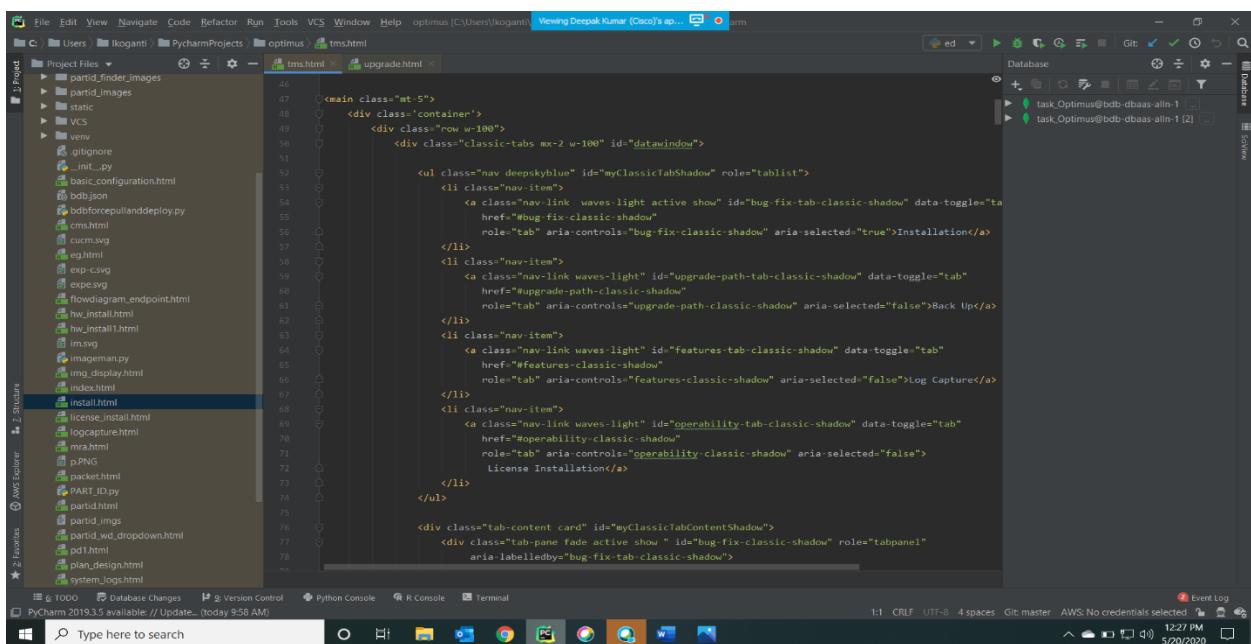
<main class="mt-5">
  <div class="container">
    <div class="row w-100">
      <div class="classic-tabs mx-2 w-100" id="datawindow">

        <ul class="nav deepskyblue" id="myClassicTabShadow" role="tablist">
          <li class="nav-item">
            <a class="nav-link waves-light active show" id="bug-fix-tab-classic-shadow" data-toggle="tab"
               href="#bug-fix-classic-shadow"
               role="tab" aria-controls="bug-fix-classic-shadow" aria-selected="true">Installation</a>
          </li>
          <li class="nav-item">
            <a class="nav-link waves-light" id="upgrade-path-tab-classic-shadow" data-toggle="tab"
               href="#upgrade-path-classic-shadow"
               role="tab" aria-controls="upgrade-path-classic-shadow" aria-selected="false">Back Up</a>
          </li>
          <li class="nav-item">
            <a class="nav-link waves-light" id="features-tab-classic-shadow" data-toggle="tab"
               href="#features-classic-shadow"
               role="tab" aria-controls="features-classic-shadow" aria-selected="false">Log Capture</a>
          </li>
          <li class="nav-item">
            <a class="nav-link waves-light" id="operability-tab-classic-shadow" data-toggle="tab"
               href="#operability-classic-shadow"
               role="tab" aria-controls="operability-classic-shadow" aria-selected="false">License Installation</a>
          </li>
        </ul>

        <div class="tab-content card" id="myClassicTabContentShadow">
          <div class="tab-pane fade active show" id="bug-fix-classic-shadow" role="tabpanel"
               aria-labelledby="bug-fix-tab-classic-shadow">

```

Fig: 5.1.11.1 TMS



```

File Edit View Navigate Code Refactor Run Tools VCS Window Help optimus (C:\Users\ikoganti) Viewing Deepak Kumar (Cisco)'s ap... arm
C:\Users\ikoganti\PycharmProjects\optimus\tms.html
Project Files
  - partid_finder_images
  - partid_images
  - static
  - VCS
  - venv
    - .gitignore
    - __init__.py
    - basic_configuration.html
    - bdb.json
    - bdbforcepullanddeploy.py
    - cms.html
    - cucm.svg
    - egi.html
    - exp-csv
    - exp-e
    - flowdiagram_endpoint.html
    - hw_install.html
    - hw_install1.html
    - im.svg
    - imageman.py
    - img_display.html
    - index.html
    - install.html
    - license_install.html
    - logcapture.html
    - mira.html
    - p.PNG
    - packet.html
    - PART_ID.py
    - partid.html
    - partid_imgs
    - partid_wd_dropdown.html
    - pdf.html
    - plan_design.html
    - system_logs.html
  - Structure
  - AWS Explorer
  - Favorites
  - Database
  - Event Log
  - TODO Database Changes Version Control Python Console R Console Terminal
  - PyCharm 2019.3.5 available // Update... (today 9:58 AM)
  - Type here to search
  - 1:1 CR LF UTF-8 4 spaces Git: master AWS: No credentials selected
  - 12:27 PM 5/20/2020

```

```

<main class="mt-5">
  <div class="container">
    <div class="row w-100">
      <div class="classic-tabs mx-2 w-100" id="datawindow">

        <ul class="nav deepskyblue" id="myClassicTabShadow" role="tablist">
          <li class="nav-item">
            <a class="nav-link waves-light active show" id="bug-fix-tab-classic-shadow" data-toggle="tab"
               href="#bug-fix-classic-shadow"
               role="tab" aria-controls="bug-fix-classic-shadow" aria-selected="true">Installation</a>
          </li>
          <li class="nav-item">
            <a class="nav-link waves-light" id="upgrade-path-tab-classic-shadow" data-toggle="tab"
               href="#upgrade-path-classic-shadow"
               role="tab" aria-controls="upgrade-path-classic-shadow" aria-selected="false">Back Up</a>
          </li>
          <li class="nav-item">
            <a class="nav-link waves-light" id="features-tab-classic-shadow" data-toggle="tab"
               href="#features-classic-shadow"
               role="tab" aria-controls="features-classic-shadow" aria-selected="false">Log Capture</a>
          </li>
          <li class="nav-item">
            <a class="nav-link waves-light" id="operability-tab-classic-shadow" data-toggle="tab"
               href="#operability-classic-shadow"
               role="tab" aria-controls="operability-classic-shadow" aria-selected="false">License Installation</a>
          </li>
        </ul>

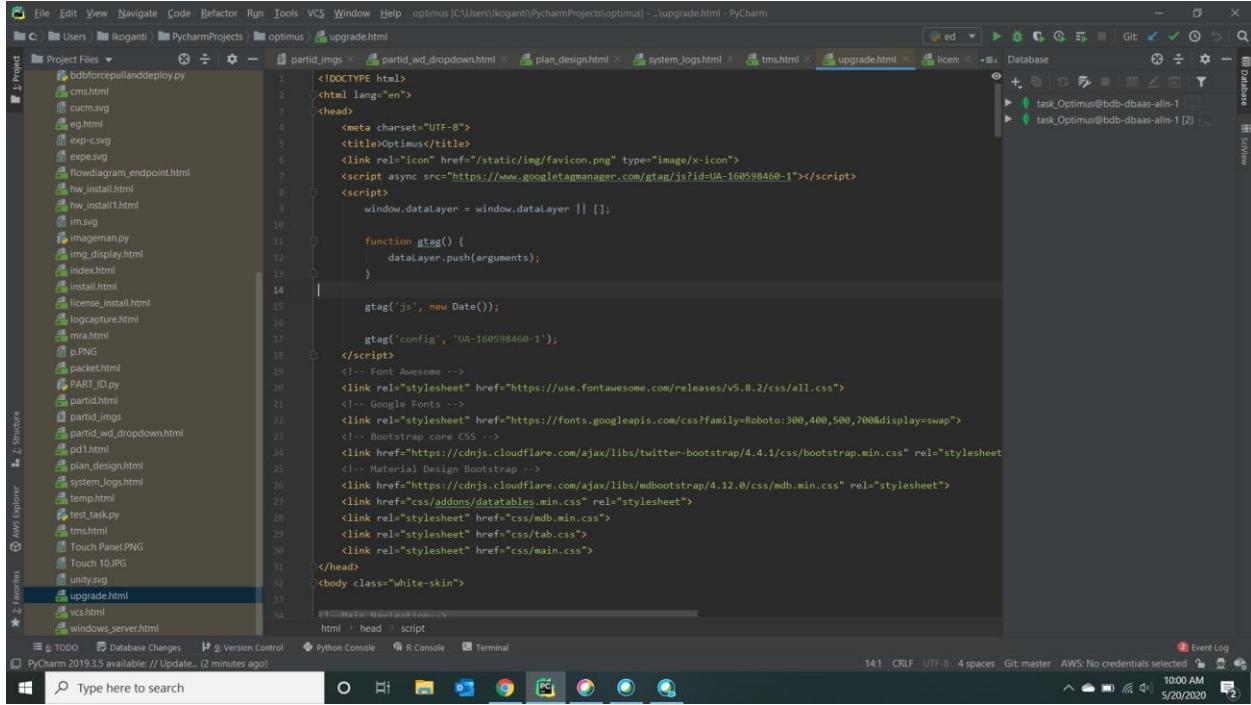
        <div class="tab-content card" id="myClassicTabContentShadow">
          <div class="tab-pane fade active show" id="bug-fix-classic-shadow" role="tabpanel"
               aria-labelledby="bug-fix-tab-classic-shadow">

```

Fig: 5.1.11.2 TMS

5.1.12 Upgrade:

Upgrade page is similar in display with the PartId Finder module. Even this page uses internal multi looping to provide all the version available for upgrading.



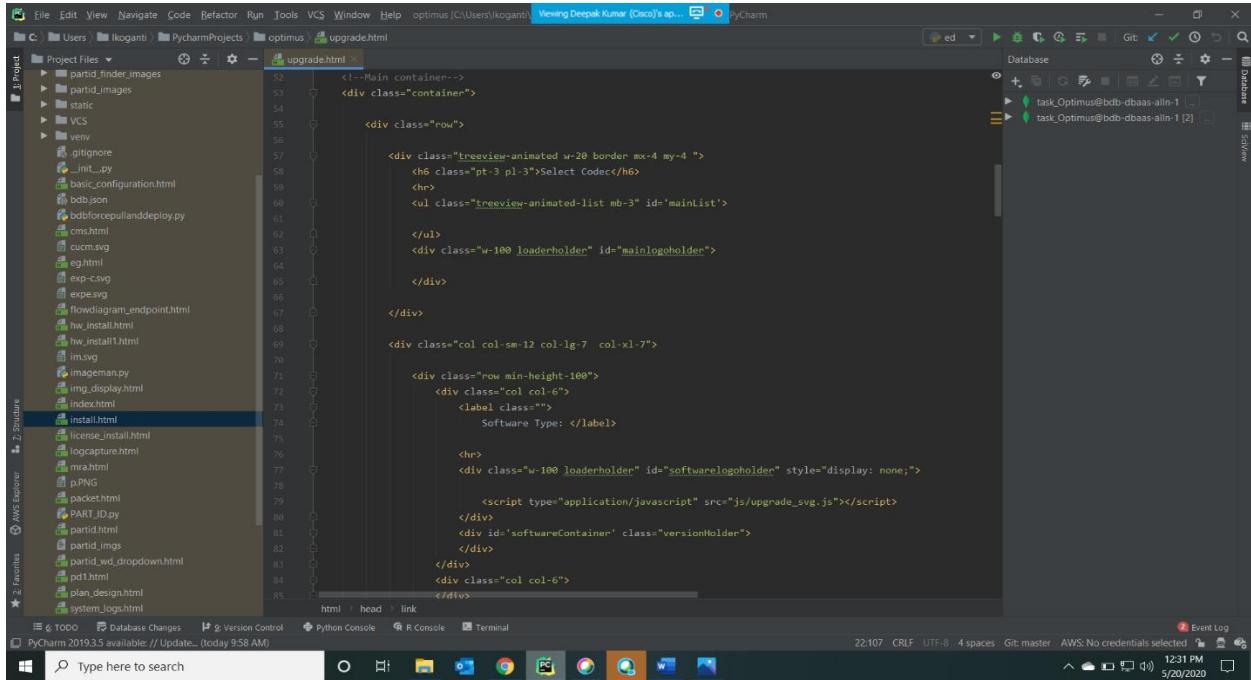
The screenshot shows the PyCharm IDE interface with the 'upgrade.html' file open in the editor. The code is an HTML file with embedded JavaScript and CSS links. It includes a head section with meta tags, a script block for Google Tag Manager, and a body section containing a main container and a loader placeholder. The code is well-structured with proper indentation and comments.

```

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Optimus</title>
    <link rel="icon" href="/static/img/favicon.png" type="image/x-icon">
    <script async src="https://www.googletagmanager.com/gtag/js?id=UA-160598460-1"></script>
    <script>
        window.dataLayer = window.dataLayer || [];
        function gtag() {
            dataLayer.push(arguments);
        }
        gtag('js', new Date());
        gtag('config', 'UA-160598460-1');
    </script>
    <!-- Font Awesome -->
    <link rel="stylesheet" href="https://use.fontawesome.com/releases/v5.8.2/css/all.css">
    <!-- Google Fonts -->
    <link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Roboto:300,400,500,700&display=swap">
    <!-- Bootstrap core CSS -->
    <link href="https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/4.4.1/css/bootstrap.min.css" rel="stylesheet">
    <!-- Material Design Bootstrap -->
    <link href="https://cdnjs.cloudflare.com/ajax/libs/mdbootstrap/4.12.0/css/mdb.min.css" rel="stylesheet">
    <link href="css/addons/datatables.min.css" rel="stylesheet">
    <link rel="stylesheet" href="css/mdb.min.css">
    <link rel="stylesheet" href="css/tab.css">
    <link rel="stylesheet" href="css/main.css">
</head>
<body class="white-skin">
    <!-- Main container -->
    <div class="container">
        <div class="row">
            <div class="treeview-animated w-20 border mx-4 my-4">
                <h6 class="pt-3 pl-3">Select Codec</h6>
                <ul class="treeview-animated-list mb-3" id="mainList">
                </ul>
                <div class="w-100 loaderholder" id="mainlogoholder">
                </div>
            </div>
            <div class="col col-sm-12 col-lg-7 col-xl-7">
                <div class="row min-height-100">
                    <div class="col col-6">
                        <label class="">
                            Software Type: </label>
                        <br>
                        <div class="w-100 loaderholder" id="softwarelogoholder" style="display: none;">
                        </div>
                        <script type="application/javascript" src="js/upgrade_svg.js"></script>
                    </div>
                    <div id="softwareContainer" class="versionHolder">
                    </div>
                </div>
                <div class="col col-6">
                </div>
            </div>
        </div>
    </div>
</body>

```

Fig: 5.1.12.1 Upgrade



The screenshot shows the PyCharm IDE interface with the 'upgrade.html' file open in the editor. The code is identical to the one shown in Fig 5.1.12.1, displaying the HTML structure for the upgrade page.

```

<!DOCTYPE html>
<html lang="en">
<head>
    <!-- Main container -->
    <div class="container">
        <div class="row">
            <div class="treeview-animated w-20 border mx-4 my-4">
                <h6 class="pt-3 pl-3">Select Codec</h6>
                <ul class="treeview-animated-list mb-3" id="mainList">
                </ul>
                <div class="w-100 loaderholder" id="mainlogoholder">
                </div>
            </div>
            <div class="col col-sm-12 col-lg-7 col-xl-7">
                <div class="row min-height-100">
                    <div class="col col-6">
                        <label class="">
                            Software Type: </label>
                        <br>
                        <div class="w-100 loaderholder" id="softwarelogoholder" style="display: none;">
                        </div>
                        <script type="application/javascript" src="js/upgrade_svg.js"></script>
                    </div>
                    <div id="softwareContainer" class="versionHolder">
                    </div>
                </div>
                <div class="col col-6">
                </div>
            </div>
        </div>
    </div>
</body>

```

Fig: 5.1.12.2 Upgrade

6. DEPLOYMENT

6.1 Work flow in modules:

(1) Installation :

- **360 view:** It is basically operates based on user's choice. The endpoint name is fetched out from the URL, using JS.
- **Hardware installation:** All the peripheral options are fetched from backend dynamically and user can choose the one of the options.

On submission of the options, depending on the choice user would be able to view how the peripherals would be integrated with endpoints.

- **Basic Configuration:** It is a kind of blue print of how would the basic setup screen, and also it specifies the procedures for choosing options that are mandatory.
- **Log Captures:** It shows user how to collect logs, and a sample zip file download that imitates the actual log capture on the end point. Zip file download is enabled using js.
- **License Installation:** Shows the steps of how to install the various features. Option key is also enabled, where in user can enter the key to purchase installation.

(2) Upgrade:

- **Side Bar Population:** All the endpoints are populated on the side bar , to gather all these endpoints , web scraping is done. All the classifications and sub-classifications are drawn out using their Xpath and python's selenium package has been exclusively used for this purpose.
- **Version Population:** All the versions are populated from the backend which include all the current,target versions corresponding to each end point that's populated in the side bar.
- **Bug Information Population:** All the bugs corresponding to each endpoint is fetched from the backend.

(3) Configuration Validator:

- **Expressway-C** : It enables users to enter all the data of configuration and this can be used by the engineering team to troubleshoot and it also allows to download files . JSPdf is used in javascript to gather all the form data.
- **Expressway-E** : It enables users to enter all the data of configuration and this can be used by the engineering team to troubleshoot and it also allows to download files . JSPdf is used in javascript to gather all the form data.
- **Certificates**: It would enable users to know the security policies used by RMA solution of deployment.
- **Port Ranges**: It specifies the port specifications required for on- premise Deployment.

(4) Part Id Finder:

- **Side Bar Population**: All the endpoints are populated on the side bar , to gather all these endpoints ,web scraping is done. All the classifications and sub-classifications are drawn out using their Xpath and python's selenium package has been exclusively used for this purpose.
- **Parts Population**: All the parts are populated from the backend which correspond to each end point that's populated in the side bar.
- **Display Part Information**: All the part information is readily displayed using JS, the part chosen corresponds to the part information stored at the backend.
- **Warranty Check**: It allows user to check if the validity of the part using its unique serial number.

(5) Plan Design:

- **Components Required:** It shows what are the essential components for deployment.
- **License Required:** It tells user the license requirements for the solution to be deployed.
- **Let Optimus deploy the solution:** This would redirect the user to the MRA solution of the Configuration Validator.
- **General Flow Diagram:** This feature shows the user how the deployment looks like. User can choose the devices and look at the flow. JS is used to dynamically insert and remove devices and connections.

(6) Simulator:

- **Simulation of Design:** This would help user to simulate their own devices with resources available in drag and drop mode, they can use their own devices and try to simulate the connections. JS is primarily used in this module.

All these modules would run simultaneously. All the image files are uploaded onto the project and all the JS and CSS related files are segregated.

All the js source files would like into JS folder and CSS are looked into css folder.

6.2 Glance Of Deployment Model:

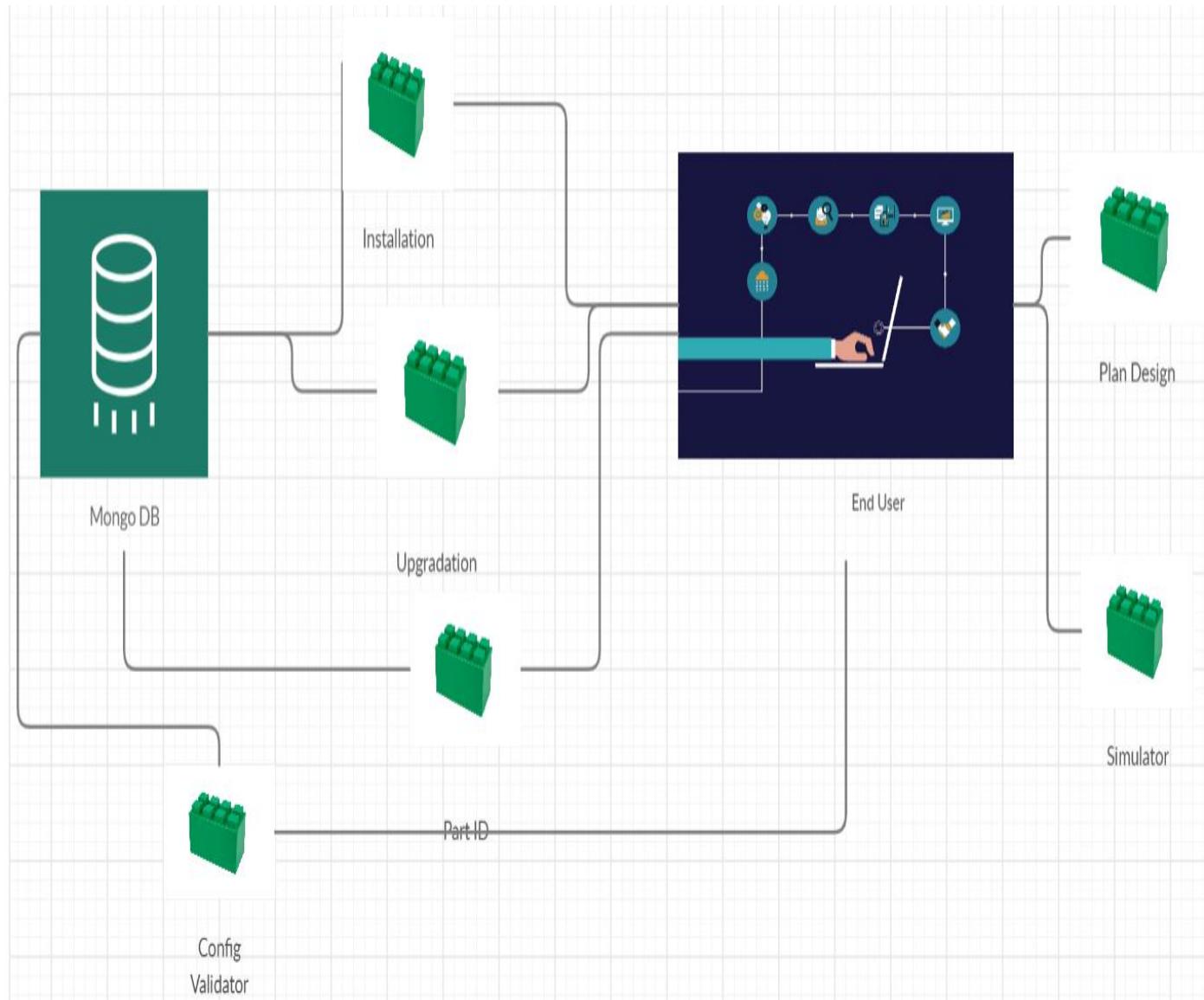


Fig: 6.2.1 Glance of Deployment Model

7. TESTING

7.1 Black Box Testing:

BLACK BOX TESTING, also known as Behavioral Testing, is a software testing method in which the internal structure/design/implementation of the item being tested is not known to the tester. This method is named so because the software program, in the eyes of the tester, is like a black box; inside which one cannot see.

7.2 Unity Testing:

UNIT TESTING is a level of software testing where individual units/ components of a software are tested. The purpose is to validate that each unit of the software performs as designed. A unit is the smallest testable part of any software. It usually has one or a few inputs and usually a single output.

7.3 Integration Testing:

INTEGRATION TESTING is a level of software testing where individual units are combined and tested as a group. The purpose of this level of testing is to expose faults in the interaction between integrated units. Test drivers and test stubs are used to assist in Integration Testing.

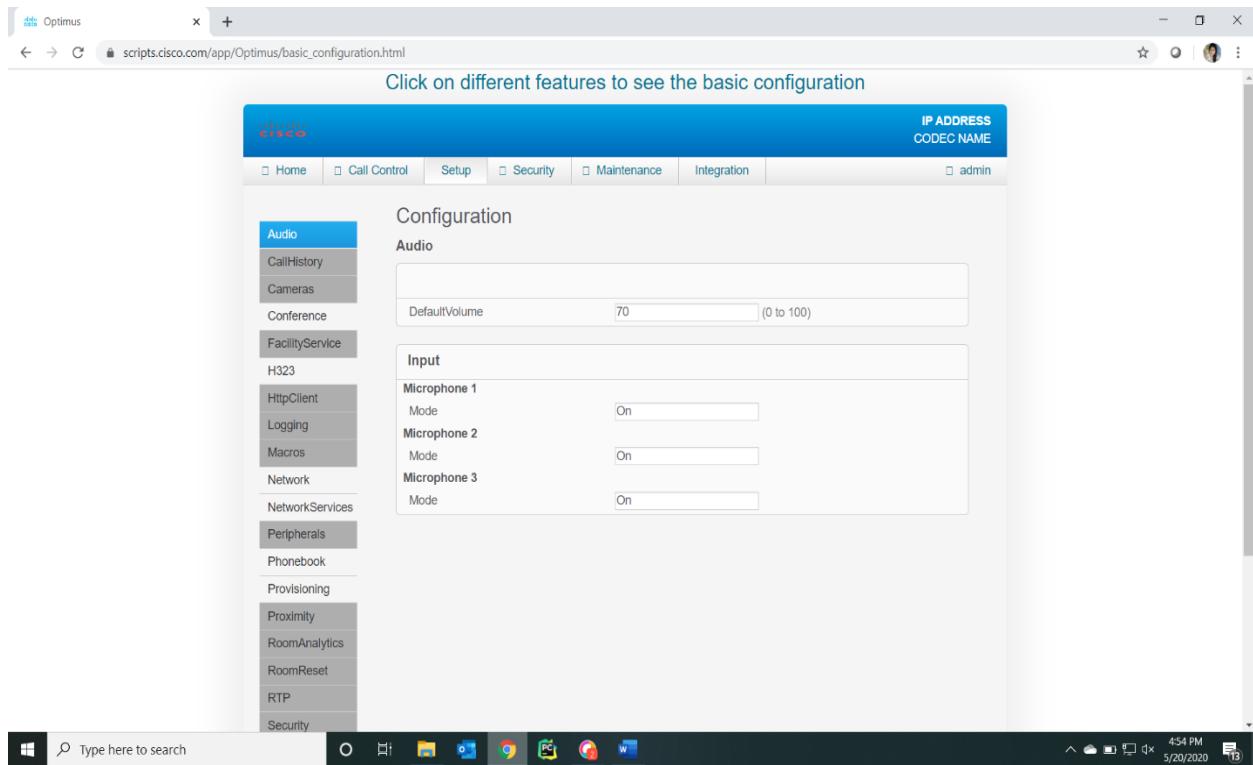


Fig: 7.1 Testing Hardware Installation

File Name	Size	Last modified
auth.log	77 kB	2020-02-27 16:59
dhclient.log	4 kB	2020-02-27 12:44
dmesg	86 kB	2020-02-25 10:54
eventlog/all.log	406 kB	2020-02-27 16:59
eventlog/all.log.first	513 kB	2020-02-25 23:34
eventlog/all.log.previous	513 kB	2020-02-27 08:38

Fig: 7.1 Testing System Logs

8. CONCLUSION AND FUTURE SCOPE

Optimus_DDUCT would make the customer experience better as it has maximum content available in a single go.

The features that would make this project user friendly are:

- Readily available End points in one place.
- All the versions of each endpoint can be easily viewed.
- Bug information of all the endpoints are available.
- User has liberty to choose their own deployment models.
- Simulations would improve the real time experience.
- All the installation procedures would be in hand.
- Organized way of representing the data.
- All the documentation of each endpoint can be easily reached.

These are the advantages of this platform. Without these characteristics of platform it would be difficult for any user to manually do and search all the aspects of the endpoints.

For instance, if user wants to know what could be the possible target versions, bugs and part information of SX10 .It would be hectic to go and do a naive search about these on the sites.

Therefore Optimus DDUCT would act as a filter that shows the data which is useful for the user to know.

And also simulations would be the time saving factor over here, wherein user can plug and play the design architecture without contacting the engineering team.

In the maintenance team perspective, it reduces the number of issues that can be fined by the customer. All the installation, setup information readily available would reduce burden on engineering team to guide the customers on the set up.

The organized data format would save the time and energy resources of both engineering team and also the customer.

9. REFERENCES

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- <https://www.cisco.com/c/dam/en/us/td/docs/telepresence/endpoint/quick-set-sx20/tc7/administration-guide/sx20-quickset-administrator-guide-tc72.pdf>
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- <https://stackoverflow.com/questions/31793455/download-multiple-images-into-1-zip-file>
- <https://gist.github.com/noelvo/4502eea719f83270c8e9>