Team

Clustroit

Solution :
Cloud Computing

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Team Members :

Participant Name	CT/DT Number	Role (Leader/Member)	Bachelors Discipline	Year of Passing	Gender
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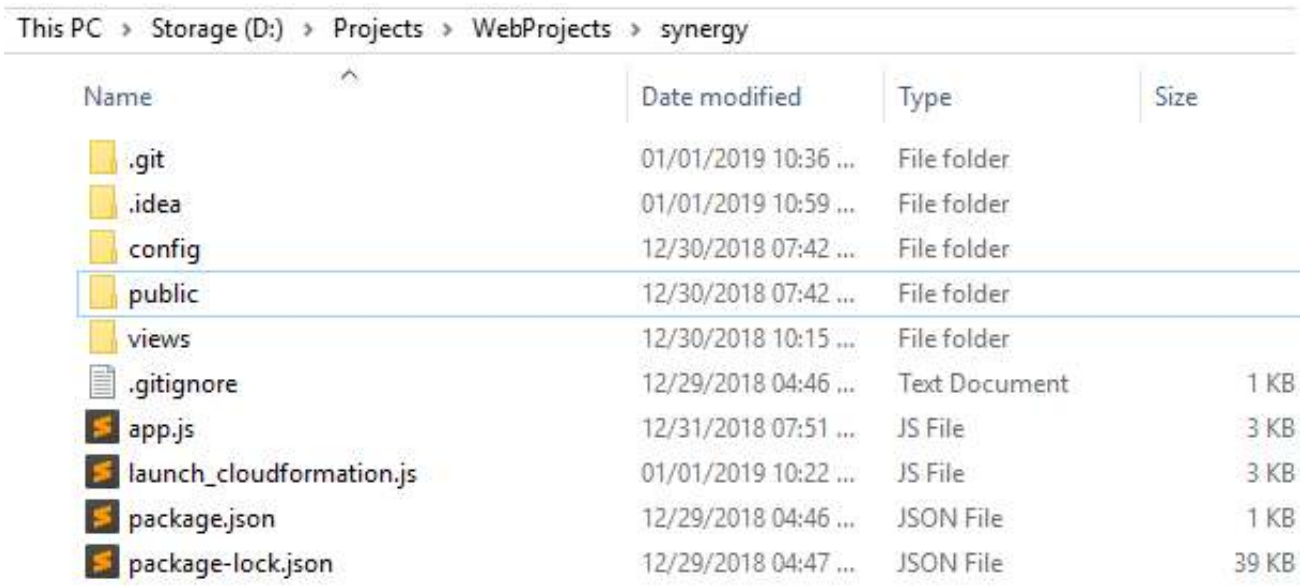
Youtube Link :

- https://youtu.be/Dz_cLwiNdec

Running the Application:

1. Create a directory with name "**synergy**".
2. Enter the directory and create all the files with their respective path.
3. Run the command "**npm install**" in the synergy directory using CMD.
4. Run the command "**node app.js**" in the synergy directory using CMD.

Directory Structure:



synergy/app.js

```
// all requires and declarations
const express = require("express"), app = express(); // creating express server
const path = require('path');
const request = require("request");
const bodyParser = require("body-parser");  // used bodyparser to get data from all the field in form
const CFNfile = require('./launch_cloudformation');


// Declaration related to servers
const PORT = process.env.PORT || 80;

//Main body of the js file
app.use(bodyParser.urlencoded({  // this is important
    extended: true
}));

app.use(bodyParser.json());  // this is important caused a lot of time waste.

app.use(express.static(path.join(__dirname, 'public')));
// app.use(express.static(path.join(__dirname, 'vendors')));
app.use(express.static(path.join(__dirname, 'views')));

app.set('view engine', 'ejs');
app.set('views', path.join(__dirname, 'views'));

app.get('/', function (req, res) {
    console.log("app.get renders : INDEX");
    res.render('index', {TITLE: "Synergy"});
});

app.get('/index', function (req, res) {
    console.log("app.get renders : INDEX");
    res.render('index', {TITLE: "Synergy"});
});


app.get('/coming', function (req, res) {
    console.log("app.get renders : COMING");
    res.render('coming', {TITLE: "Synergy"});
});

app.get('/custom_env', function (req, res) {
    console.log("app.get renders : CUSTOM_ENV");
    res.render('custom_env', {TITLE: "Launch Custom Environment"});
});


request('http://169.254.169.254/latest/meta-data/public-ipv4', function (error, response, body) {
    if (body !== undefined) console.log('server started on ip:port : http://' + body + ":" + PORT);
    else console.log('server started on ip:port : ' + 'http://localhost' + ":" + PORT);
});
```

synergy/app.js

```
app.listen(PORT, function (err) {
    if (err) console.log("There was some problem in starting the server  : " + JSON.stringify(err,
undefined, 2));
    else console.log('server started on port : ' + PORT);
});

console.log('Server-side code running');

app.get('/launchstack', function (req, res) {
    console.log("app.get renders : LAUNCHSTACK");
    res.render("launchstack", {TITLE: "Launch Stack"});
});

app.post('/launchstack', function (req, res) {
    console.log("app.get renders :  LAUNCHSTACK POST REQ");
    console.log(req.body.stackName);
    CFNfile.createSTK(req.body.stackName);
});

app.get('/outputs', function (req, res) {
    console.log("app.get renders : OUTPUTS");
    res.render("outputs", {TITLE: "OUTPUTS"});
});

app.post('/outputs', function (req, res) {
    console.log("app.post return data to ajax : OUTPUTS");

    try {
        CFNfile.getStackOutputs(function (outdata) {
            if (outdata) console.log("Sending DATA " + JSON.stringify(outdata));
            else outdata = null;
            res.send({outdata: outdata});
        });
    } catch (e) {
        res.send("error");
    }

});
```

synergy/launch_cloudformation.js

```
const AWS = require('aws-sdk');
const express = require("express"), app = express(); // creating express server
const path = require('path');
const request = require("request");
const bodyParser = require("body-parser");  // used bodyparser to get data from all the field in form
const awsCredentials = (require("./config/config")).getAWS_JSONCredentials();

AWS.config.update(awsCredentials);
// console.log(awsCredentials);

const cloudformation = new AWS.CloudFormation();
const templateString = JSON.stringify(require("./config/synergy_enviroment"));
// console.log(templateString);

// let stackName = "";

let mainbody = {
    stackName: "",

    createSTK: function (stackName) {
        mainbody.stackName = stackName;

        const params = {
            StackName: mainbody.stackName, /* required */
            EnableTerminationProtection: false,
            OnFailure: "DO_NOTHING",
            TemplateBody: (templateString),
        };
        console.log(params);

        try {
            // remove comments from below lines when used in producation enviroment. this lines can
cause charges.
            cloudformation.createStack(params, function (err, data) {
                if (err) console.log(err, err.stack); // an error occurred
                else console.log(data);           // successful response
            });
        } catch (e) {
            console.log("Error : " + JSON.stringify(e));
        }

    },

    getStackOutputs: function (callback) {
        const params = {
            StackName: 'AnnantVPC'//mainbody.stackName
        };
        try {

            cloudformation.describeStacks(params, function (err, data) {
                if (err) { // console.log(err, err.stack);
                    console.log("callback = null");
```

synergy/launch_cloudformation.js

```
callback(null);
                }

                // an error occurred
                else {
                    // noinspection UnnecessaryLocalVariableJS
                    let outputs = (data['Stacks'][0])['Outputs'];
                    callback(outputs);
                }           // successful response
            });
        } catch (e) {
            console.log("Eroor in Describe" + JSON.stringify(e));
            callback(null);
        }
    }


};

module.exports = mainbody;
```

synergy/package.json

```
{
  "name": "synergy_web",
  "version": "1.0.0",
  "main": "app.js",
  "scripts": {
    “test": "echo \"Error: no test specified\" && exit 1"
  },
  "author": "annant",
  "license": "ISC",
  "dependencies": {
    "aws-sdk": "^2.382.0",
    "body-parser": "latest",
    "ejs": "^2.6.1",
    "express": "^4.16.4",
    "jquery": "^3.3.1",
    "node-cmd": "^3.0.0",
    "popups": "^1.1.3",
    "public-ip": "^3.0.0",
    “request": "^2.87.0"
  },
  "repository": {
    "type": "git",
    “url": "git+https://github.com/annant05/sy_node_project.git"
  },
  "bugs": {
    “url": "https://github.com/annant05/sy_node_project/issues"
  },
  "homepage": "https://github.com/annant05/sy_node_project#readme",
  “description": "Node Js application for Synergy Website"
}
```

synergy/views/partials/bottom_js_scripts.ejs

```
<!-- Jquery JS-->
<script src="/vendor/jquery-3.2.1.min.js"></script>
<!-- Bootstrap JS-->
<script src="/vendor/bootstrap-4.1/popper.min.js"></script>
<script src="/vendor/bootstrap-4.1/bootstrap.min.js"></script>
<!-- /vendor JS       -->
<script src="/vendor/slick/slick.min.js">
</script>
<script src="/vendor/wow/wow.min.js"></script>
<script src="/vendor/animsition/animsition.min.js"></script>
<script src="/vendor/bootstrap-progressbar/bootstrap-progressbar.min.js">
</script>
<script src="/vendor/counter-up/jquery.waypoints.min.js"></script>
<script src="/vendor/counter-up/jquery.counterup.min.js">
</script>
<script src="/vendor/circle-progress/circle-progress.min.js"></script>
<script src="/vendor/perfect-scrollbar/perfect-scrollbar.js"></script>
<script src="/vendor/chartjs/Chart.bundle.min.js"></script>
<script src="/vendor/select2/select2.min.js">
</script>
```

synergy/views/partials/head_css.ejs

```
<!-- Required meta tags-->
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
<meta name="description" content="au theme template">
<meta name="author" content="Hau Nguyen">
<meta name="keywords" content="au theme template">

<!-- Title Page-->
<title><%= TITLE %> </title>

<!-- Fontfaces CSS-->
<link href="/css/font-face.css" rel="stylesheet" media="all">
<link href="/vendor/font-awesome-4.7/css/font-awesome.min.css" rel="stylesheet" media="all">
<link href="/vendor/font-awesome-5/css/fontawesome-all.min.css" rel="stylesheet" media="all">
<link href="/vendor/mdi-font/css/material-design-iconic-font.min.css" rel="stylesheet" media="all">

<!-- Bootstrap CSS-->
<link href="/vendor/bootstrap-4.1/bootstrap.min.css" rel="stylesheet" media="all">

<!-- /vendor CSS-->
<link href="/vendor/animsition/animsition.min.css" rel="stylesheet" media="all">
<link href="/vendor/bootstrap-progressbar/bootstrap-progressbar-3.3.4.min.css" rel="stylesheet"
media="all">
<link href="/vendor/wow/animate.css" rel="stylesheet" media="all">
<link href="/vendor/css-hamburgers/hamburgers.min.css" rel="stylesheet" media="all">
<link href="/vendor/slick/slick.css" rel="stylesheet" media="all">
<link href="/vendor/select2/select2.min.css" rel="stylesheet" media="all">
<link href="/vendor/perfect-scrollbar/perfect-scrollbar.css" rel="stylesheet" media="all">

<!-- Main CSS-->
<link href="/css/theme.css" rel="stylesheet" media="all">
<script src="js/wow.min.js"></script>

<!--include jquery-->
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.3.1/jquery.min.js"></script>
<script>
    new WOW().init();
</script>
```

synergy/views/partials/header_desktop.ejs

```
<!-- HEADER DESKTOP-->
<header class="header-desktop">
    <div class="section__content section__content--p30">
        <div class="container-fluid">
            <div class="header-wrap">
                <form class="form-header" action="" method="POST">
                    <input class="au-input au-input--xl" type="text" name="search"
                           placeholder="What do you want to do?"/>
                    <button class="au-btn--submit" type="submit">
                        <I class="zmdi zmdi-search"></i>
                    </button>
                </form>
                <div class="header-button">
                    <div class="noti-wrap">


                    </div>
                    <div class="account-wrap">
                        <div class="account-item clearfix js-item-menu">
                            <div class="image">
                                <img src="/images/icon/avatar-01.jpg" alt="John Doe"/>
                            </div>
                            <div class="content">
                                <a class="js-acc-btn" href="#">Ankit C.</a>
                            </div>
                            <div class="account-dropdown js-dropdown">
                                <div class="info clearfix">
                                    <div class="image">
                                        <a href="#">
                                            <img src="/images/icon/avatar-01.jpg" alt="Ankit"/>
                                        </a>
                                    </div>
                                    <div class="content">
                                        <h5 class="name">
                                            <a href="#">Ankit Choudhary</a>
                                        </h5>
                                        <span class="email">c.ankit1997@gmail.com</span>
                                    </div>
                                </div>
                                <div class="account-dropdown__body">
                                    <div class="account-dropdown__item">
                                        <a href="#">
                                            <I class="zmdi zmdi-account"></i>Account</a>
                                    </div>
                                    <div class="account-dropdown__item">
                                        <a href="#">
                                            <I class="zmdi zmdi-settings"></i>Setting</a>
                                    </div>
                                    <div class="account-dropdown__item">
                                        <a href="#">
                                            <I class="zmdi zmdi-money-box"></i>Billing</a>
                                    </div>
```

synergy/views/partials/header_desktop.ejs

```
 </div>
                        <div class="account-dropdown__footer">
                            <a href="/login">
                                <I class="zmdi zmdi-power"></i>Logout</a>
                        </div>
                    </div>
                </div>
            </div>
        </div>
    </div>
</header>
<!-- HEADER DESKTOP-->

                        </div>
                        <div class="account-dropdown__footer">
                            <a href="/login">
                                <I class="zmdi zmdi-power"></i>Logout</a>
                        </div>
                    </div>
                </div>
            </div>
        </div>
    </div>
</header>
<!-- HEADER DESKTOP-->
```

synergy/views/partials/header_mobile.ejs

```
<!-- HEADER MOBILE-->
<header class="header-mobile d-block d-lg-none">
    <div class="header-mobile__bar">
        <div class="container-fluid">
            <div class="header-mobile-inner">
                <a class="logo" href="/index">
                    <img src="/images/icon/logo.png" alt="CoolAdmin"/>
                </a>
                <button class="hamburger hamburger--slider" type="button">
                        <span class="hamburger-box">
                            <span class="hamburger-inner"></span>
                        </span>
                </button>
            </div>
        </div>
    </div>
    <nav class="navbar-mobile">
        <div class="container-fluid">
            <ul class="navbar-mobile__list list-unstyled">
                <li class="has-sub">
                    <a class="js-arrow" href="/index">
                        <I class="fas fa-tachometer-alt"></i>Dashboard</a>
                </li>
                <li>
                    <a href="/coming">
                        <I class="fas fa-users"></i>Collaborators</a>
                </li>
                <li>
                    <a href="/outputs">
                        <I class="fas fa-bar-chart"></i>Monitor</a>
                </li>
                <li>
                    <a href="/coming">
                        <I class="far fa-clock-o"></i>Alarms</a>
                </li>
                <li>
                    <a href="/coming">
                        <I class="fas fa-life-ring"></i>Support</a>
                </li>
            </ul>
        </div>
    </nav>
</header>
<!-- END HEADER MOBILE-->
```

synergy/views/partials/menu_sidebar.ejs

```
<!-- MENU SIDEBAR-->
<aside class="menu-sidebar d-none d-lg-block">
    <div class="logo">
        <a href="/index">
            <img src="/images/icon/logo.png" alt="Cool Admin"/>
        </a>
    </div>
    <div class="menu-sidebar__content js-scrollbar1">
        <nav class="navbar-sidebar">
            <ul class="list-unstyled navbar__list">
                <li class="has-sub">
                    <a class="js-arrow" href="/index">
                        <I class="fas fa-tachometer-alt"></i>Dashboard</a>
                </li>
                <li>
                    <a href="/coming">
                        <I class="fas fa-users"></i>Collaborators</a>
                </li>
                <li>
                    <a href="/outputs">
                        <I class="fas fa-bar-chart"></i>Monitor</a>
                </li>
                <li>
                    <a href="/coming">
                        <I class="far fa-clock-o"></i>Alarms</a>
                </li>
                <li>
                    <a href="/coming">
                        <I class="fas fa-life-ring"></i>Support</a>
                </li>
            </ul>
        </nav>
    </div>
</aside>
<!-- END MENU SIDEBAR-->
```

synergy/views/index.ejs

```
<!DOCTYPE html>
<html lang="en">

<!--suppress HtmlRequiredTitleElement -->
<head>
    <% include partials/head_css.ejs %>
</head>

<body class="animsition">
<div class="page-wrapper">

    <% include partials/header_mobile.ejs %>
    <% include partials/menu_sidebar.ejs %>

    <!-- PAGE CONTAINER-->
    <div class="page-container">

        <% include partials/header_desktop.ejs %>

        <!-- MAIN CONTENT-->
        <div class="main-content">
            <div class="section__content section__content--p30">
                <div class="container-fluid">

                    <div class="row">
                        <div class="col-md-12">
                            <div class="overview-wrap">
                                <h2 class="title-1 animated fadeInDown">overview</h2>
                            </div>
                        </div>
                    </div>
                    <div class="row m-t-25">
                        <div class="col-sm-6 col-md-4 animated fadeIn">
                            <a href="/custom_env">
                                <div class="overview-item overview-item--c1 animated fadeInDown">
                                    <div class="overview__inner">
                                        <div class="overview-box clearfix text-center fun_box">
                                            <div class="icon">
                                                <img class="img-responsive"
                                                     style="margin-bottom:20px; width:72px; height:70px;"
                                                     src="/images/cloud-computing.png">
                                            </div>
                                            <div class="text">
                                                <h2>Launch a Custom Environment</h2>
                                            </div>
                                        </div>
                                    </div>
                                </div>
                            </a>
                        </div>
                        <div class="col-sm-6 col-md-4 animated fadeIn">
                            <div class="overview-item overview-item--c2 animated fadeInUp">
```

synergy/views/index.ejs

```
<div class="overview__inner">
                        <div class="overview-box clearfix text-center fun_box ">
                            <div class="icon">
                                <img class="img-responsive"
                                     style="margin-bottom:22px; width:67px; height:67px;"
                                     src="/images/cloud-network.png">
                            </div>
                            <div class="text">
                                <h2>Create a Template</h2><br>
                            </div>
                        </div>
                    </div>
                </div>
                <div class="col-sm-6 col-md-4 animated fadeIn">
                    <a href="/launchstack">
                        <div class="overview-item overview-item--c3 animated fadeInDown">
                            <div class="overview__inner">
                                <div class="overview-box clearfix text-center fun_box">
                                    <div class="icon">
                                        <img class="img-responsive"
                                             style="margin-bottom:20px; width:70px; height:70px;"
                                             src="/images/file.png">
                                    </div>
                                    <div class="text">
                                        <h2>Launch from existing Template</h2>
                                    </div>
                                </div>
                            </div>
                        </div>
                    </a>
                </div>
            </div>
 <!---- Action First End (More Functionality can be added here, if we extend this project)----->


            <br>
            <div class="col-lg-12 col-md-12">
                <h2 class="title-1 m-b-25 animated fadeInDown">Your Environments</h2>
                <div class="row">
                    <div class="col-md-12">
                        <div class="row">
                            <div class="col-lg-12 shadow p-3 mb-5 bg-white rounded">
                                <div class="table-responsive table-data">
                                    <table class="table">
                                        <thead>
                                        <tr>
                                            <td>Name</td>
                                            <td>ID</td>
                                            <td>Web Servers</td>
                                            <td>DB Servers</td>
                                            <td>Launch Time</td>
```

synergy/views/index.ejs

```
<td>Status</td>
                                    </tr>
                                    </thead>
                                    <tbody>
                                    <tr>
                                       <td>
                                          <div class="table-data__info">
                                             <h6>TCS</h6>
                                          </div>
                                       </td>
                                       <td>78456598</td>
                                       <td>2</td>
                                       <td>1</td>
                                       <td>December 22, 2018 at 11:50 PM</td>
                                       <td>
                                          <span class="role member">Deployed</span>
                                       </td>
                                    </tr>

                                    <tr>
                                       <td>
                                          <div class="table-data__info">
                                             <h6>Clustroit</h6>
                                          </div>
                                       </td>
                                       <td>54698754</td>
                                       <td>4</td>
                                       <td>1</td>
                                       <td>December 21, 2018 at 12:30 PM</td>
                                       <td>
                                          <span class="role admin">Deleted </span>
                                       </td>
                                    </tr>
                                    </tbody>
                                 </table>
                              </div>

                           </div>
                        </div>
                     </div>
                  </div>
               </div>
               <br>
               <h2 class="title-1 m-b-25 animated fadeInDown">Quick Analytics</h2>
               <div class="row">
                  <div class="col-lg-6">
                     <div class="au-card m-b-30">
                        <div class="au-card-inner">
                           <h3 class="title-2 m-b-40">Usage Stats</h3>
                           <canvas id="pieChart"></canvas>
                        </div>
                     </div>
```

synergy/views/index.ejs

```
</div>
                    <div class="col-lg-6">
                        <div class="au-card m-b-30">
                            <div class="au-card-inner">
                                <h3 class="title-2 m-b-40">Expected Bill</h3>
                                <canvas id="singelBarChart"></canvas>
                                <br>
                            </div>
                        </div>
                    </div>
                </div>

                <!--- Action Second Section End (More Functionality can be added here, if we extend this
project)---->

                <div class="row">
                    <div class="col-md-12">
                        <div class="copyright">
                            <p>Developed by Team Clustroit | TCS Inframind Contest</p>
                        </div>
                    </div>
                </div>
            </div>
        </div>
    </div>
    <!-- END MAIN CONTENT-->
    <!-- END PAGE CONTAINER-->
</div>

<% include partials/bottom_js_scripts.ejs %>

<!-- Main JS-->
<script src="/js/main.js"></script>
</body>
</html>
<!-- end document-->
```

synergy/views/coming.ejs

```
<!DOCTYPE html>
<html lang="en">

<!--suppress HtmlRequiredTitleElement -->
<head>
    <% include partials/head_css.ejs %>
</head>

<body class="animsition">
<div class="page-wrapper">

    <% include partials/header_mobile.ejs %>
    <% include partials/menu_sidebar.ejs %>

    <!-- PAGE CONTAINER-->
    <div class="page-container">
        <% include partials/header_desktop.ejs %>

        <!-- MAIN CONTENT-->
        <div class="main-content">
            <div class="section__content section__content--p30">
                <div class="container-fluid">
                    <div class="col-lg-12 col-md-12">
                        <div class="row">
                            <div class="col-md-12">
                                <div class="row">
                                    <div class="col-lg-12 shadow p-3 mb-5 bg-white rounded text-center">
                                        <img class="img-responsive animated fadeInDown"
src="/images/umbrella.gif">
                                        <div class="text-center animated fadeInUp">
                                            <h2>Team Clustroit is working on something awesome!</h2>
                                            <br>
                                            <br>
                                        </div>
                                    </div>
                                </div>
                            </div>
                        </div>
                    </div>

                    <!--- Action Second Section End (More Functionality can be added here, if we extend this
project)---->

                    <div class="row">
                        <div class="col-md-12">
                            <div class="copyright">
                                <p>Developed by Team Clustroit | TCS Inframind Contest</p>
                            </div>
                        </div>
                    </div>
                </div>
            </div>
```

synergy/views/coming.ejs

```
        </div>
        <!-- END MAIN CONTENT-->
        <!-- END PAGE CONTAINER-->
    </div>

</div>

<% include partials/bottom_js_scripts.ejs %>

<!-- Main JS-->
<script src="/js/main.js"></script>

</body>
</html>
<!-- end document-->
```

synergy/views/custom_env.ejs

```
<!DOCTYPE html>
<html lang="en">

<!--suppress HtmlRequiredTitleElement -->
<head>
   <% include partials/head_css.ejs %>
</head>

<body class="animsition">
<div class="page-wrapper">

   <% include partials/header_mobile.ejs %>
   <% include partials/menu_sidebar.ejs %>

   <!-- PAGE CONTAINER-->
   <div class="page-container">
      <% include partials/header_desktop.ejs %>

      <!-- MAIN CONTENT-->
      <div class="main-content">
         <div class="section__content section__content--p30">
            <div class="container-fluid">
               <div class="col-lg-12 col-md-12">
                  <h2 class="title-1 m-b-25 animated fadeInDown">Your Environments</h2>
                  <div class="row">
                     <div class="col-md-12">
                        <div class="row">
                           <div class="col-lg-12 shadow p-3 mb-5 bg-white rounded">
                              <div class="card-body">
                                 <div class="default-tab">
                                    <nav>
                                       <div class="nav nav-tabs" id="nav-tab" role="tablist">
                                          <a class="nav-item nav-link active" id="nav-home-tab"
                                             data-toggle="tab" href="#nav-home" role="tab"
                                             aria-controls="nav-home"
                                             aria-selected="true">VPC</a>
                                          <a class="nav-item nav-link" id="nav-profile-tab"
                                             data-toggle="tab" href="#nav-profile" role="tab"
                                             aria-controls="nav-profile"
                                             aria-selected="false">Server</a>
                                       </div>
                                    </nav>
                                    <div class="tab-content pl-3 pt-2" id="nav-tabContent">
                                       <br>
                                       <div class="tab-pane fade show active" id="nav-home"
role="tabpanel"
                                            aria-labelledby="nav-home-tab">
                                          <!---------------------------->

                                          <form action="" method="post" class="form-horizontal">
                                             <div class="row form-group">
                                                <div class="col col-md-3">
```

synergy/views/custom_env.ejs

```
                                        <label for="hf-email" class=" form-control-
label">VPC</label>
                                    </div>
                                    <div class="col-12 col-md-9">
                                        <input type="name" id="hf-email" name="hf-email"
                                            placeholder="Enter VPC Name"
                                            class="form-control">
                                    </div>
                                </div>
                                <div class="row form-group">
                                    <div class="col col-md-3">
                                        <label for="hf-email" class=" form-control-label">Public
                                            Subnet</label>
                                    </div>
                                    <div class="col-12 col-md-9">
                                        <input type="name" id="hf-email" name="hf-email"
                                            placeholder="Enter no. of Public Subnets"
                                            class="form-control">
                                    </div>
                                </div>
                                <div class="row form-group">
                                    <div class="col col-md-3">
                                        <p>Add Private Subnets?</p>
                                    </div>
                                    <div class="col-12 col-md-9">
                                        <label class="switch switch-3d switch-primary mr-2">
                                            <input type="radio" class="switch-input"
                                                id="chkSubnet" Unchecked>
                                            <span class="switch-label"></span>
                                            <span class="switch-handle"></span>
                                        </label>
                                    </div>
                                </div>
                                <div class="row form-group" id="pvtSubnet">
                                    <div class="col col-md-3">
                                        <label for="hf-email" class=" form-control-label">Private
                                            Subnet</label>
                                    </div>
                                    <div class="col-12 col-md-9">
                                        <input type="name" id="hf-email" name="hf-email"
                                            placeholder="Enter no. of Private Subnets"
                                            class="form-control">
                                    </div>
                                </div>
                                <a href="#nav-profile" class="float-right">
                                    <button class="btn btn-primary float-right">Next
                                    </button>
                                </a>
                            </form>

                            <!---------------------------->
                        </div>
```

synergy/views/custom_env.ejs

```
<div class="tab-pane fade" id="nav-profile" role="tabpanel"
    aria-labelledby="nav-profile-tab">
   <div class="row form-group">
      <div class="col col-md-3">
         <label for="hf-email" class=" form-control-label">No. of
            Instances</label>
      </div>
      <div class="col-12 col-md-9">
         <input type="name" id="hf-email" name="hf-email"
               placeholder="Enter No. of Instances"
               class="form-control">
      </div>
   </div>
   <div class="row form-group">
      <div class="col col-md-3">
         <label class=" form-control-label">Memory</label>
      </div>
      <div class="col col-md-9">
         <div class="form-check">
            <div class="checkbox">
               <label for="checkbox1"
                     class="form-check-label ">
                  <input type="checkbox" id="checkbox1"
                        name="checkbox1" value="0.5 GB"
                        class="form-check-input">0.5 GB
               </label>
            </div>
            <div class="checkbox">
               <label for="checkbox2"
                     class="form-check-label ">
                  <input type="checkbox" id="checkbox2"
                        name="checkbox2" value="1 GB"
                        class="form-check-input"> 1 GB
               </label>
            </div>
            <div class="checkbox">
               <label for="checkbox3"
                     class="form-check-label ">
                  <input type="checkbox" id="checkbox3"
                        name="checkbox3" value="2 GB"
                        class="form-check-input"> 2 GB
               </label>
            </div>
            <div class="checkbox">
               <label for="checkbox4"
                     class="form-check-label ">
                  <input type="checkbox" id="checkbox4"
                        name="checkbox4" value="4 GB"
                        class="form-check-input"> 4 GB
               </label>
            </div>
         </div>
```

synergy/views/custom_env.ejs

```
                                    </div>
                                </div>
                                <div class="row form-group">
                                    <div class="col col-md-3">
                                        <label for="hf-email" class=" form-control-
label">Storage</label>
                                    </div>
                                    <div class="col-12 col-md-9">
                                        <input type="name" id="hf-email" name="hf-email"
                                            placeholder="Enter amount of storage you want"
                                            class="form-control">
                                    </div>
                                </div>
                                <a href="#nav-profile" class="float-right">
                                    <button class="btn btn-primary float-right">Next</button>
                                </a>
                            </div>
                        </div>
                    </div>
                </div>
            </div>
        </div>
    </div>
    <!--- Action Second Section End (More Functionality can be added here, if we extend this
project)---->

    <div class="row">
        <div class="col-md-12">
            <div class="copyright">
                <p>Developed by Team Clustroit | TCS Inframind Contest</p>
            </div>
        </div>
    </div>
</div>
</div>
</div>
<!-- END MAIN CONTENT-->
<!-- END PAGE CONTAINER-->
</div>
</div>
<% include partials/bottom_js_scripts.ejs %>
<!-- Main JS-->
<script src="/js/main.js"></script>

</body>

</html>
<!-- end document-->
```

synergy/views/launchstack.ejs

```
<!DOCTYPE html>
<html lang="en">

<!--suppress HtmlRequiredTitleElement -->
<head>
    <% include partials/head_css.ejs %>

</head>

<body class="animsition">
<div class="page-wrapper">

    <% include partials/header_mobile.ejs %>
    <% include partials/menu_sidebar.ejs %>

    <!-- PAGE CONTAINER-->
    <div class="page-container">
        <% include partials/header_desktop.ejs %>

        <!-- MAIN CONTENT-->
        <div class="main-content">
            <div class="section__content section__content--p30">
                <div class="container-fluid">
                    <div class="col-lg-12 col-md-12">
                        <div class="row">
                            <div class="col-md-12">
                                <div class="row">
                                    <div class="col-lg-12 shadow p-3 mb-5 bg-white rounded text-center">


                                        <form>
                                            <label>Input Stack Name:
                                                <input type="text" id="stackName" name="stackName" required>
                                            </label>
                                            <button type="button" id="launchstack"> Launch Stack</button>
                                        </form>

                                    </div>
                                </div>
                            </div>
                        </div>
                    </div>

                    <!--- Action Second Section End (More Functionality can be added here, if we extend this
project)---->

                    <div class="row">
                        <div class="col-md-12">
                            <div class="copyright">
                                <p>Developed by Team Clustroit | TCS Inframind Contest</p>
                            </div>
                        </div>
```

synergy/views/launchstack.ejs

```
                </div>
              </div>
            </div>
        </div>
        <!-- END MAIN CONTENT-->
        <!-- END PAGE CONTAINER-->
    </div>

</div>

<%include partials/bottom_js_scripts.ejs%>

<!-- Main JS-->
<script src="/js/main.js"></script>

<script src="/js/launchajax.js"></script>

</body>

</html>
<!-- end document-->
```

synergy/views/outputs.ejs

```
<!DOCTYPE html>
<html lang="en">

<!--suppress HtmlRequiredTitleElement -->
<head>
    <% include partials/head_css.ejs %>
    <style>
        .hide-table {
            visibility: hidden;
        }
    </style>
</head>

<body class="animsition">
<div class="page-wrapper">

    <% include partials/header_mobile.ejs %>
    <% include partials/menu_sidebar.ejs %>

    <!-- PAGE CONTAINER-->
    <div class="page-container">

        <% include partials/header_desktop.ejs %>

        <!-- MAIN CONTENT-->
        <div class="main-content">
            <div class="section__content section__content--p30">
                <div class="container-fluid">

                    <br>
                    <div class="col-lg-12 col-md-12">
                        <h2 class="title-1 m-b-25 animated fadeInDown">Resources</h2>
                        <div class="row">

                            <button id="refresh-button" style="margin-left: 4px;margin-bottom: 20px;"
                                    class="btn btn-info btn-lg">
                                Refresh
                            </button>

                        </div>
                        <div class="row">
                            <div class="col-md-12">
                                <div class="row">
                                    <div class="col-lg-12 shadow p-3 mb-5 bg-white rounded">

                                        <div class="table-responsive table-data " id="table_container">
                                            <table class="table hide-table" id="table">
                                                <thead>
                                                <tr>
                                                    <td>Resource Name</td>
                                                    <td>Value</td>
                                                </tr>
```

synergy/views/outputs.ejs

```
                                    </thead>
                                    <tbody id="table_body">

                                    </tbody>
                                </table>
                            </div>

                        </div>
                    </div>
                </div>
            </div>
            <br>

            <!--- Action Second Section End (More Functionality can be added here, if we extend this
project)---->

            <div class="row">
                <div class="col-md-12">
                    <div class="copyright">
                        <p>Developed by Team Clustroit | TCS Inframind Contest</p>
                    </div>
                </div>
            </div>
        </div>
    </div>
    <!-- END MAIN CONTENT-->
    <!-- END PAGE CONTAINER-->
  </div>
</div>
<% include partials/bottom_js_scripts.ejs %>

<!-- Main JS-->
<script src="/js/main.js"></script>
<script src="/js/outputsajax.js"></script>

</body>
</html>
<!-- end document-->
```

synergy/config/config.js

```
// The following constant has credentials for the AWS.
const awsCredentialConfig = {
    region: "ap-southeast-1",
    // The endpoint should point to the local or remote computer where DynamoDB (downloadable) is
running.
    // endpoint: ‘http://localhost:8000'
    // endpoint: ‘https://dynamodb.us-east-1.amazonaws.com'
    /*
      accessKeyId and secretAccessKey defaults can be used while using the downloadable version of
DynamoDB.
      For security reasons, do not store AWS Credentials in your files. Use Amazon Cognito instead.
    */
    // accessKeyId: "yourAccessKey",
    // secretAccessKey: "yourSecretKey”
};

module.exports = {
    getAWS_JSONCredentials: function () {
        return awsCredentialConfig;
    }
};
```

synergy/public/js/launchajax.js

```
$(function () {

    // CREATE/POST
    $("#launchstack").click(function () {
        console.log("click Detected");
        const stackName = $("#stackName").val();
        // setInterval(300);
        console.log(stackName);
        $.ajax({
            url: '/launchstack',
            method: 'POST',
            contentType: 'application/json',
            data: JSON.stringify({stackName: stackName}),
            // success: function (response) {
            //     console.log(response.items[0]);
            //     var $item = response.items[0];
            //     $(".m_stud_fullname").text($item.name + " " + $item.stud_last_name);
            // }
        }).done(alert(`Your stack ${stackName} has been launched!`));

    });
});
```

synergy/public/js/outputsajax.js

```
const refreshButton = $("#refresh-button");
const tableOut = $("#table");
const tableBody = $("#table_body");

refreshButton.click(refreshTable);

function getDataFromAJAX(callback) {
    $.ajax({
        url: '/outputs',
        method: 'POST',
        contentType: 'application/json',
        success: function (response) {
            console.log("original response " + response);
            callback(response['outdata']);
        }
    })
}

function refreshTable() {
    // CREATE/POST
    console.log("click Detected");
    tableBody.children().remove(); // remove the tabled body
    getDataFromAJAX(function (datafromcallback) {
        console.log("got response from ajax function "
            + (datafromcallback[0]) + " \n the above data ");
        let tableoutbody = "";

        datafromcallback.forEach(function (elements) {
            tableoutbody += `<tr>
                        <td>${elements['OutputKey']} </td>
                        <td>${elements['OutputValue']} </td>
                        </tr>`
        });
        console.log(tableoutbody);

        tableOut.removeClass('hide-table');
        tableBody.append(tableoutbody);

    });

}

$(document).ready(refreshTable());
```

synergy/config/synergy_enviroment.json

```
{
  "AWSTemplateFormatVersion": "2010-09-09",
  "Description": "Synergy template with Load balancer ,2 web servers and 1 db server  in a vpc ",

  "Parameters": {},
  "Conditions" : {

  },

  "Mappings" : {

    "AWSInstanceType2Arch" : {
      "t2.nano"     : { "Arch" : "HVM64"  },
      "t2.micro"    : { "Arch" : "HVM64"  },
      "t2.small"    : { "Arch" : "HVM64"  },
      "t2.medium"   : { "Arch" : "HVM64"  },
      "t2.large"    : { "Arch" : "HVM64"  }
    },

    "AWSInstanceType2NATArch" : {
      "t2.nano"     : { "Arch" : "NATHVM64"  },
      "t2.micro"    : { "Arch" : "NATHVM64"  },
      "t2.small"    : { "Arch" : "NATHVM64"  },
      "t2.medium"   : { "Arch" : "NATHVM64"  },
      "t2.large"    : { "Arch" : "NATHVM64"  }
    },

    "AWSRegionArch2AMI" : {
      "ap-southeast-1"   : { "HVM64" : "ami-a69b49c5"},
      "ap-south-1"       : { "HVM64" : "ami-fdbed492"}
    }

  },

  "Resources": {



    "ALBListener" : {
      "DependsOn":
["SynergyPublicSubnet","sgAllowsHTTPandHTTPS","SynergyVPC","PublicSubnet","WebServer1","W
ebServer2","DbServer","ApplicationLoadBalancerELB"],
      "Type" : "AWS::ElasticLoadBalancingV2::Listener",
      "Properties" : {
        "DefaultActions" : [{
          "Type" : "forward",
          "TargetGroupArn" : { "Ref" : "ALBTargetGroup" }
        }],
        "LoadBalancerArn" : { "Ref" : "ApplicationLoadBalancerELB" },
        "Port" : "80",
        "Protocol" : "HTTP”
      }
```

synergy/config/synergy_enviroment.json

```
    },
    "ApplicationLoadBalancerELB" : {
      "DependsOn":
["SynergyPublicSubnet","sgAllowsHTTPandHTTPS","SynergyVPC","PublicSubnet","WebServer1","W
ebServer2","DbServer","ALBTargetGroup"],
      "Type" : "AWS::ElasticLoadBalancingV2::LoadBalancer",
      "Properties" : {
        "Scheme" : "internet-facing",
        "Subnets" : [ {"Ref" : "PublicSubnet"}, {"Ref" : "SynergyPublicSubnet"}],
        "SecurityGroups" : [{"Ref": "sgAllowsHTTPandHTTPS"}]
      }
    },
    "ALBTargetGroup" : {
      "DependsOn":
["SynergyPublicSubnet","sgAllowsHTTPandHTTPS","SynergyVPC","PublicSubnet","WebServer1","W
ebServer2","DbServer"],
      "Type" : "AWS::ElasticLoadBalancingV2::TargetGroup",
      "Properties" : {
        "HealthCheckIntervalSeconds" : 60,
        "UnhealthyThresholdCount" : 10,
        "HealthCheckPath" : "/",
        "Name" : "WebServersTargetGroup",
        "Port" : 80,
        "Protocol" : "HTTP",
        "VpcId" : { "Ref": "SynergyVPC" },
        "Targets": [{ "Id": {"Ref" : "WebServer1"}, "Port": 80 }, { "Id": {"Ref" : "WebServer2"}, "Port": 80 }]
      }
    },




    "WebServer1" : {
      "Type" : "AWS::EC2::Instance",
      "DependsOn": ["SynergyPublicSubnet","SynergyVPC"],

      "Properties": {
        "Tags": [{"Key": "Name","Value": "WebServer1"}],
        "ImageId" : { "Fn::FindInMap" : [ "AWSRegionArch2AMI", { "Ref" : "AWS::Region" },
          { "Fn::FindInMap" : [ "AWSInstanceType2Arch", "t2.micro", "Arch" ] } ] },
        "InstanceType"       : "t2.micro",
        "SecurityGroupIds"     : [ {"Ref" : "sgAllowSSH"},{"Ref": "sgAllowsHTTPandHTTPS" } ],
        "UserData"           : { "Fn::Base64" : { "Fn::Join" : ["", [
          "#!/bin/bash -ex\n",
          "yum -y update\n",
          "yum -y install httpd php mysql php-mysql\n",
          "chkconfig httpd on\n",
          "/etc/init.d/httpd start\n",
          "if [ ! -f /var/www/html/lab2-app.tar.gz ]; then\n",
          "cd /var/www/html\n",
          "wget https://us-west-2-aws-training.s3.amazonaws.com/awsu-ilt/AWS-100-ESS/v4.1/lab-2-
```

synergy/config/synergy_enviroment.json

```
configure-website-datastore/scripts/lab2-app.tar.gz\n",
          "tar xvfz lab2-app.tar.gz\n",
          "chown apache:root /var/www/html/rds.conf.php\n",
          “fi\n"

        ]]}},
        "KeyName" : "SynergyKey",
        "SubnetId": {"Ref": "SynergyPublicSubnet"}

      }
    },




    "WebServer2" : {
      "Type" : "AWS::EC2::Instance",
      "DependsOn": ["PublicSubnet","SynergyVPC"],
      "Properties": {
        "Tags": [
          {
            "Key": "Name",
            “Value": "WebServer2"
          }
        ],
        "ImageId" : { "Fn::FindInMap" : [ "AWSRegionArch2AMI", { "Ref" : "AWS::Region" },
          { "Fn::FindInMap" : [ "AWSInstanceType2Arch", "t2.micro", "Arch" ] } ] },
        "InstanceType"       : "t2.micro",
        "SecurityGroupIds"     : [ {"Ref" : "sgAllowSSH"},{"Ref": "sgAllowsHTTPandHTTPS" } ],
        "UserData"           : { "Fn::Base64" : { "Fn::Join" : ["", [
          "#!/bin/bash -ex\n",
          "yum -y update\n",
          "yum -y install httpd php mysql php-mysql\n",
          "chkconfig httpd on\n",
          "/etc/init.d/httpd start\n",
          "if [ ! -f /var/www/html/lab2-app.tar.gz ]; then\n",
          "cd /var/www/html\n",
          "wget https://us-west-2-aws-training.s3.amazonaws.com/awsu-ilt/AWS-100-ESS/v4.1/lab-2-
configure-website-datastore/scripts/lab2-app.tar.gz\n",
          "tar xvfz lab2-app.tar.gz\n",
          "chown apache:root /var/www/html/rds.conf.php\n",
          “fi\n"

        ]]}},
        "KeyName" : "SynergyKey",
        "SubnetId": {"Ref": "PublicSubnet"}

      }
    },
```

synergy/config/synergy_enviroment.json

```
   "DbServer" : {
     "Type" : "AWS::EC2::Instance",
     "DependsOn": ["SynergyPublicSubnet","SynergyVPC"],

     "Properties": {
       "Tags": [
         {
           "Key": "Name",
           “Value": "DatabaseServer"
         }
       ],
       "ImageId" : { "Fn::FindInMap" : [ "AWSRegionArch2AMI", { "Ref" : "AWS::Region" },
         { "Fn::FindInMap" : [ "AWSInstanceType2Arch", "t2.micro", "Arch" ] } ] },
       "InstanceType"       : "t2.micro",
       "SecurityGroupIds"     : [ {"Ref": "sgSSHandDatabaseSG" } ],
       "UserData"           : { "Fn::Base64" : { "Fn::Join" : ["", [
         "#!/bin/bash -ex\n",
         "yum -y update\n",
         "yum -y install httpd php mysql php-mysql\n",
         "chkconfig httpd on\n",
         "/etc/init.d/httpd start\n",
         "if [ ! -f /var/www/html/lab2-app.tar.gz ]; then\n",
         "cd /var/www/html\n",
         "wget https://us-west-2-aws-training.s3.amazonaws.com/awsu-ilt/AWS-100-ESS/v4.1/lab-2-
configure-website-datastore/scripts/lab2-app.tar.gz\n",
         "tar xvfz lab2-app.tar.gz\n",
         "chown apache:root /var/www/html/rds.conf.php\n",
         “fi\n"

       ]]}},
       "KeyName" : "SynergyKey",
       "SubnetId": {"Ref": "SynergyPublicSubnet"}

     }
   },




   "SynergyVPC": {
     "Type": "AWS::EC2::VPC",
     "Properties": {
       "CidrBlock": "10.0.0.0/16",
       "InstanceTenancy": "default",
       "EnableDnsSupport": "true",
       "EnableDnsHostnames": "false",
       "Tags": [
         {
           "Key": "Name",
           “Value": "SynergyVPC"
         }
```

synergy/config/synergy_enviroment.json

```
    ]
  }
},



"SynergyPrivateSubnet": {
  "Type": "AWS::EC2::Subnet",
  "Properties": {
    "CidrBlock": "10.0.2.0/24",
    "MapPublicIpOnLaunch": "true",
    "AvailabilityZone": "ap-southeast-1a",
    "VpcId": {
      “Ref": "SynergyVPC"
    },
    "Tags": [
      {
        "Key": "Name",
        “Value": "SynergyPrivateSubnet"
      }
    ]
  }
},



"PrivateSubnet": {
  "Type": "AWS::EC2::Subnet",
  "Properties": {
    "MapPublicIpOnLaunch": "true",
    "CidrBlock": "10.0.4.0/24",
    "AvailabilityZone": "ap-southeast-1b",
    "VpcId": {
      “Ref": "SynergyVPC"
    },
    "Tags": [
      {
        "Key": "Name",
        “Value": "PrivateSubnet"
      }
    ]
  }
},



"PublicSubnet": {
  "Type": "AWS::EC2::Subnet",
  "Properties": {
    "CidrBlock": "10.0.3.0/24",
```

synergy/config/synergy_enviroment.json

```
    "MapPublicIpOnLaunch": "true",
    "AvailabilityZone": "ap-southeast-1b",
    "VpcId": {
      “Ref": "SynergyVPC"
    },
    "Tags": [
      {
        "Key": "Name",
        “Value": "PublicSubnet"
      }
    ]
  }
},


"SynergyPublicSubnet": {
  "Type": "AWS::EC2::Subnet",
  "Properties": {
    "CidrBlock": "10.0.1.0/24",
    "MapPublicIpOnLaunch": "true",
    "AvailabilityZone": "ap-southeast-1a",
    "VpcId": {
      “Ref": "SynergyVPC"
    },
    "Tags": [
      {
        "Key": "Name",
        “Value": "SynergyPublicSubnet"
      }
    ]
  }
},


"SynergyInternetGateway": {
  "Type": "AWS::EC2::InternetGateway",
  "Properties": {
    "Tags": [
      {
        "Key": "Name",
        “Value": "SynergyInternetGateway"
      }
    ]
  }
},



"SynergyVpcDHCP": {
  "Type": "AWS::EC2::DHCPOptions",
  "Properties": {
    "Tags": [
```

synergy/config/synergy_enviroment.json

```
      {
        "Key": "Name",
        “Value": "SynergyVpcDHCP"
      }
    ],
    "DomainName": "ap-southeast-1.compute.internal",
    "DomainNameServers": [
      "AmazonProvidedDNS”
    ]
  }
},



"PrivateRouteTable": {
  "Type": "AWS::EC2::RouteTable",
  "Properties": {
    "VpcId": {
      “Ref": "SynergyVPC"
    },
    "Tags": [
      {
        "Key": "Network",
        “Value": "Private"
      },
      {
        "Key": "Name",
        “Value": "PrivateRouteTable"
      }
    ]
  }
},



"PublicRouteTable": {
  "Type": "AWS::EC2::RouteTable",
  "Properties": {
    "VpcId": {
      “Ref": "SynergyVPC"
    },
    "Tags": [
      {
        "Key": "Network",
        “Value": "Public"
      },
      {
        "Key": "Name",
        “Value": "PublicRouteTable"
      }
    ]
  }
```

synergy/config/synergy_enviroment.json

```
},



"sgAllowSSH": {
  "Type": "AWS::EC2::SecurityGroup",
  "Properties": {
    "GroupDescription": "Let it use SSH",
    "VpcId": {
      “Ref": "SynergyVPC"
    },
    "Tags": [
      {
        "Key": "Name",
        “Value": "AllowSSH"
      }
    ]
  }
},



"sgAllowsHTTPandHTTPS": {
  "Type": "AWS::EC2::SecurityGroup",
  "Properties": {
    "GroupDescription": "Allows Http and Https traffic",
    "VpcId": {
      “Ref": "SynergyVPC"
    },
    "Tags": [
      {
        "Key": "Name",
        “Value": "AllowWebAccess"
      }
    ]
  }
},


"sgSSHandDatabaseSG": {
  "Type": "AWS::EC2::SecurityGroup",
  "Properties": {
    "GroupDescription": "Database access",
    "VpcId": {
      “Ref": "SynergyVPC"
    }
  }
},



"sgdefault": {
```

synergy/config/synergy_enviroment.json

```
  "Type": "AWS::EC2::SecurityGroup",
  "Properties": {
    "GroupDescription": "default VPC security group",
    "VpcId": {
      “Ref": "SynergyVPC"
    },
    "Tags": [
      {
        "Key": "Name",
        “Value": "DefaultSG"
      }
    ]
  }
},



"SynergySingleNACL": {
  "Type": "AWS::EC2::NetworkAcl",
  "Properties": {
    "VpcId": {
      “Ref": "SynergyVPC"
    },
    "Tags": [
      {
        "Key": "Name",
        “Value": "SynergySingleNACL"
      }
    ]
  }
},


"acl1": {
  "Type": "AWS::EC2::NetworkAclEntry",
  "Properties": {
    "CidrBlock": "0.0.0.0/0",
    "Egress": "true",
    "Protocol": "-1",
    "RuleAction": "allow",
    "RuleNumber": "100",
    "NetworkAclId": {
      “Ref": "SynergySingleNACL"
    }
  }
},
"acl2": {
  "Type": "AWS::EC2::NetworkAclEntry",
  "Properties": {
    "CidrBlock": "0.0.0.0/0",
```

synergy/config/synergy_enviroment.json

```
      "Protocol": "-1",
      "RuleAction": "allow",
      "RuleNumber": "100",
      "NetworkAclId": {
        “Ref": "SynergySingleNACL"
      }
    }
  },


  "gw1": {
    "Type": "AWS::EC2::VPCGatewayAttachment",
    "Properties": {
      "VpcId": {
        “Ref": "SynergyVPC"
      },
      "InternetGatewayId": {
        “Ref": "SynergyInternetGateway"
      }
    }
  },


  "subnetroute1": {
    "Type": "AWS::EC2::SubnetRouteTableAssociation",
    "Properties": {
      "RouteTableId": {
        “Ref": "PrivateRouteTable"
      },
      "SubnetId": {
        “Ref": "PrivateSubnet"
      }
    }
  },
  "subnetroute2": {
    "Type": "AWS::EC2::SubnetRouteTableAssociation",
    "Properties": {
      "RouteTableId": {
        “Ref": "PrivateRouteTable"
      },
      "SubnetId": {
        “Ref": "SynergyPrivateSubnet"
      }
    }
  },
  "subnetroute4": {
    "Type": "AWS::EC2::SubnetRouteTableAssociation",
    "Properties": {
      "RouteTableId": {
        “Ref": "PublicRouteTable"
      },
      "SubnetId": {
```

synergy/config/synergy_enviroment.json

```
        “Ref": "SynergyPublicSubnet"
      }
    }
  },
  "subnetroute5": {
    "Type": "AWS::EC2::SubnetRouteTableAssociation",
    "Properties": {
      "RouteTableId": {
        “Ref": "PublicRouteTable"
      },
      "SubnetId": {
        “Ref": "PublicSubnet"
      }
    }
  },

  "route1": {
    "Type": "AWS::EC2::Route",
    "Properties": {
      "DestinationCidrBlock": "0.0.0.0/0",
      "RouteTableId": {
        “Ref": "PrivateRouteTable"
      },
      "GatewayId": {
        “Ref": "SynergyInternetGateway"
      }
    },
    “DependsOn": "gw1"
  },


  "route2": {
    "Type": "AWS::EC2::Route",
    "Properties": {
      "DestinationCidrBlock": "0.0.0.0/0",
      "RouteTableId": {
        “Ref": "PublicRouteTable"
      },
      "GatewayId": {
        “Ref": "SynergyInternetGateway"
      }
    },
    “DependsOn": "gw1"
  },

  "dchpassoc1": {
    "Type": "AWS::EC2::VPCDHCPOptionsAssociation",
    "Properties": {
      "VpcId": {
        “Ref": "SynergyVPC"
      },
      "DhcpOptionsId": {
```

synergy/config/synergy_enviroment.json

```
        “Ref": "SynergyVpcDHCP"
      }
    }
  },


  "ingress1": {
    "Type": "AWS::EC2::SecurityGroupIngress",
    "Properties": {
      "GroupId": {
        “Ref": "sgAllowSSH"
      },
      "IpProtocol": "tcp",
      "FromPort": "22",
      "ToPort": "22",
      “CidrIp": "0.0.0.0/0"
    }
  },
  "ingress2": {
    "Type": "AWS::EC2::SecurityGroupIngress",
    "Properties": {
      "GroupId": {
        “Ref": "sgAllowsHTTPandHTTPS"
      },
      "IpProtocol": "tcp",
      "FromPort": "80",
      "ToPort": "80",
      “CidrIp": "0.0.0.0/0"
    }
  },
  "ingress3": {
    "Type": "AWS::EC2::SecurityGroupIngress",
    "Properties": {
      "GroupId": {
        “Ref": "sgAllowsHTTPandHTTPS"
      },
      "IpProtocol": "tcp",
      "FromPort": "443",
      "ToPort": "443",
      “CidrIp": "0.0.0.0/0"
    }
  },
  "ingress4": {
    "Type": "AWS::EC2::SecurityGroupIngress",
    "Properties": {
      "GroupId": {
        “Ref": "sgSSHandDatabaseSG"
      },
      "IpProtocol": "tcp",
      "FromPort": "22",
      "ToPort": "22",
      “CidrIp": "0.0.0.0/0"
```

synergy/config/synergy_enviroment.json

```
        “Ref": "SynergyVpcDHCP"
      }
    }
  },


  "ingress1": {
    "Type": "AWS::EC2::SecurityGroupIngress",
    "Properties": {
      "GroupId": {
        “Ref": "sgAllowSSH"
      },
      "IpProtocol": "tcp",
      "FromPort": "22",
      "ToPort": "22",
      “CidrIp": "0.0.0.0/0"
    }
  },
  "ingress2": {
    "Type": "AWS::EC2::SecurityGroupIngress",
    "Properties": {
      "GroupId": {
        “Ref": "sgAllowsHTTPandHTTPS"
      },
      "IpProtocol": "tcp",
      "FromPort": "80",
      "ToPort": "80",
      “CidrIp": "0.0.0.0/0"
    }
  },
  "ingress3": {
    "Type": "AWS::EC2::SecurityGroupIngress",
    "Properties": {
      "GroupId": {
        “Ref": "sgAllowsHTTPandHTTPS"
      },
      "IpProtocol": "tcp",
      "FromPort": "443",
      "ToPort": "443",
      “CidrIp": "0.0.0.0/0"
    }
  },
  "ingress4": {
    "Type": "AWS::EC2::SecurityGroupIngress",
    "Properties": {
      "GroupId": {
        “Ref": "sgSSHandDatabaseSG"
      },
      "IpProtocol": "tcp",
      "FromPort": "22",
      "ToPort": "22",
      “CidrIp": "0.0.0.0/0"
```

synergy/config/synergy_enviroment.json

```
    }
  },
  "ingress5": {
    "Type": "AWS::EC2::SecurityGroupIngress",
    "Properties": {
      "GroupId": {
        “Ref": "sgSSHandDatabaseSG"
      },
      "IpProtocol": "tcp",
      "FromPort": "3306",
      "ToPort": "3306",
      “CidrIp": "0.0.0.0/0"
    }
  },
  "ingress6": {
    "Type": "AWS::EC2::SecurityGroupIngress",
    "Properties": {
      "GroupId": {
        “Ref": "sgdefault"
      },
      "IpProtocol": "-1",
      "SourceSecurityGroupId": {
        “Ref": "sgdefault"
      },
      “SourceSecurityGroupOwnerId": "805746249177"
    }
  },
  "egress1": {
    "Type": "AWS::EC2::SecurityGroupEgress",
    "Properties": {
      "GroupId": {
        “Ref": "sgAllowSSH"
      },
      "IpProtocol": "-1",
      “CidrIp": "0.0.0.0/0"
    }
  },
  "egress2": {
    "Type": "AWS::EC2::SecurityGroupEgress",
    "Properties": {
      "GroupId": {
        “Ref": "sgAllowsHTTPandHTTPS"
      },
      "IpProtocol": "-1",
      “CidrIp": "0.0.0.0/0"
    }
  },
  "egress3": {
    "Type": "AWS::EC2::SecurityGroupEgress",
    "Properties": {
      "GroupId": {
        “Ref": "sgSSHandDatabaseSG"
```

synergy/config/synergy_enviroment.json

```
      },
      "IpProtocol": "-1",
      “CidrIp": "0.0.0.0/0"
    }
  },
  "egress4": {
    "Type": "AWS::EC2::SecurityGroupEgress",
    "Properties": {
      "GroupId": {
        “Ref": "sgdefault"
      },
      "IpProtocol": "-1",
      “CidrIp": "0.0.0.0/0"
    }
  }
},




"Outputs": {

  "VpcId" : {
    "Description": "The VPC ID",
    "Value" : { "Ref" : "SynergyVPC" }
  },

  "VpcCIDR" : {
    "Description": "The VPC ID",
    "Value": {"Fn::GetAtt": ["SynergyVPC", "CidrBlock"]}
  },

  "PrivateSubnetID": {
    "Description": " PrivateSubnetID",
    "Value": {
      “Ref": "PrivateSubnet"
    }
  },
  "SynergyPrivateSubnetID": {
    "Description": "SynergyPrivateSubnetID",
    "Value": {
      “Ref": "SynergyPrivateSubnet"
    }
  },
  "SynergyPublicSubnetID": {
    "Description": "SynergyPublicSubnetID",
    "Value": {
      “Ref": "SynergyPublicSubnet"
    }
  },
  "PublicSubnetID": {
```

synergy/config/synergy_enviroment.json

```
      "Description": "PublicSubnetID",
      "Value": { "Ref": "PublicSubnet"}
    },

    "WebServer1PublicIP" : {
      "Description": "Public IP of web server 1",
      "Value": { "Fn::Join": ["",["http://",{"Fn::GetAtt": ["WebServer1","PublicIp"]}]]}
    },

    "WebServer2PublicIP" : {
      "Description": "Public IP of web server 2",
      "Value": { "Fn::Join": ["",["http://",{"Fn::GetAtt": ["WebServer2","PublicIp"]}]]}
    },

    "DbServerIP": {
      "Description": "Public IP of Database Server",
      "Value":  { "Fn::Join": ["",["http://",{"Fn::GetAtt": ["DbServer","PublicIp"]}]]}
    },

    "ElbOutput": {
      "Description": "DNS to Access Elastic IP",
      "Value":  { "Fn::Join": ["",["http://",{"Fn::GetAtt" :["ApplicationLoadBalancerELB" , "DNSName" ]}]]}
    }

  }

}
```

“When the world is moving faster than ever, why should the process of creating/updating your application environment be slow and manual ?”

Introduction/ Understanding the Problem statement:

Excess time and resources required to build or perorm updations in an existing application environment creates a problem for the organizations and also is a very tedious task.

Some of the problems faced in the process are:

- The plethora of organizational and human resources being wasted to perorm a simple task.
- Delay in creating and running environment due to a series of unnecessary steps involved.

How does Synergy solve the above-mentioned problems:

We aim at building a web interace that would facilitate the process of creating an application environment by creating a common cloud environment and deploy it on the request of the user. The idea is to minimize human intererence and automate the process so as to increase the ef ciency in managing and deploying the cloud environment. The implementation of **Synergy** will solve the following problems:

- No human intererence will reduce the organization’s human resources required and thus increase ef ciency.
- Reduce the time required in creating an up and running environment.
- Reduce the steps required, so that the competence can be improved.

- With a single click the user can spin up servers, databases and additional components.

Details of technology Used:

The proposed solution is leveraging many new technologies and framework to provide the user with a quick and seamless user experience.

Frontend (Web Poral):

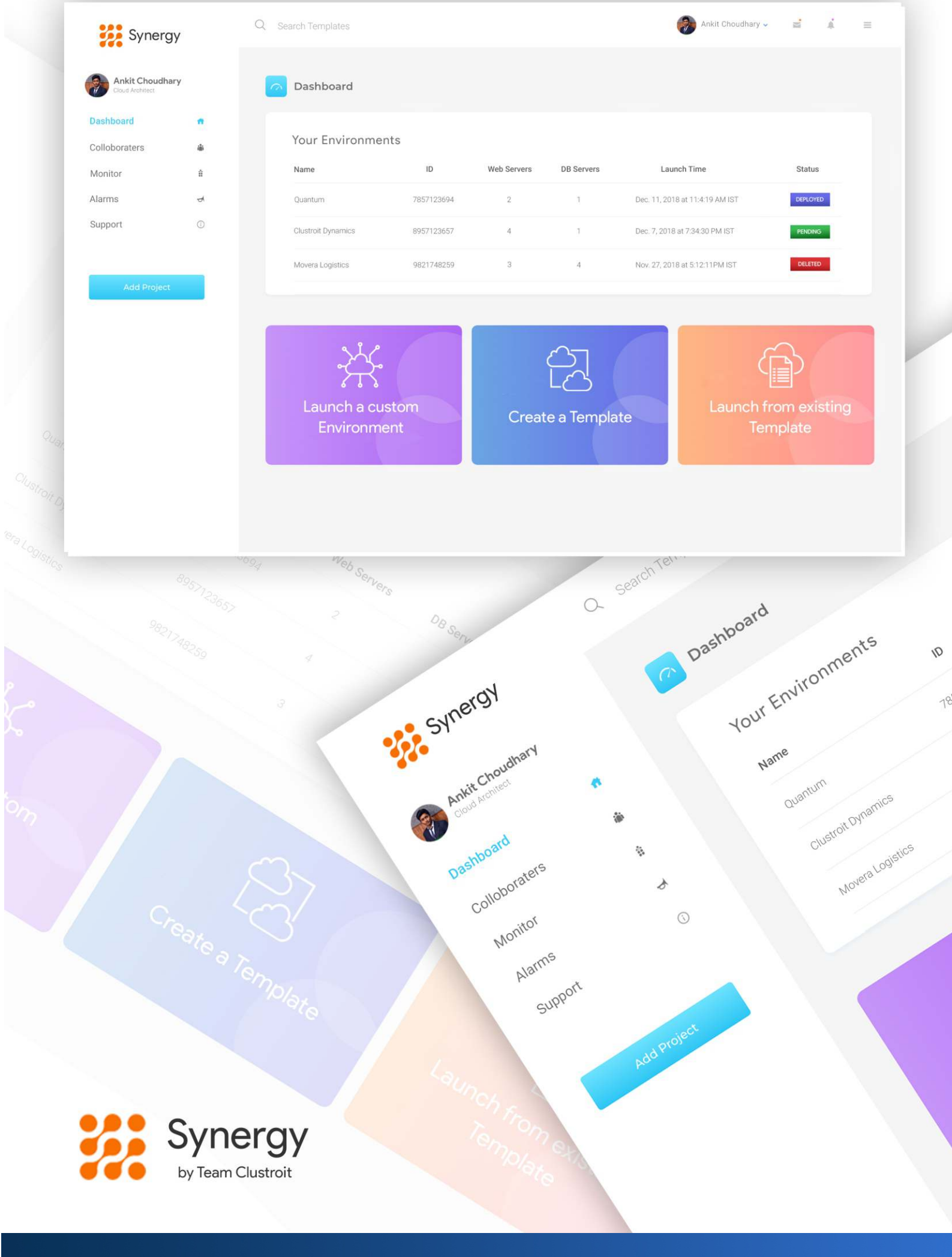
A Web Poral where the user can interact with their connguration using a web browser. The web poral leverages technologies used in web engineering.

1. Node.js: An asynchronous event-driven JavaScript runtime, Node is designed to build scalable network application. This runtime framework will be used to provide the user with dynamic web pages.

2. Express Framework: Express is a minimal and fl xible Node.js web application framework that provides a robust set of features for the application.

3. Angular: AngularJS is a structural framework for creating dynamic web apps including animation.

4. Amazon DynamoDB: It is a fast and fexible database service for any scale that will be used to store data collected from the user.



Synergy
by Team Clustroit

Backend (Synergy):

The solution for Synergy will be deployed using many managed cloud services for highly automated and reliable deployment.

1. **Amazon Elastic Compute Cloud (EC2):** EC2 is a web service that provides secure, resizable compute capacity in the cloud. All the required web servers will be deployed as Amazon EC2 instances. EC2 provides many managed services that are used to create the application environment.
2. **EC2 Elastic Load Balancing:** Elastic Load Balancing automatically distributes incoming application traf c across target Amazon EC2 instances. It is a managed service so the user need not to worry about the perormance of the load balancer.
4. **Amazon Virtual Private Cloud:** Amazon VPC is a logically isolated section of the Amazon Web Services (AWS) Cloud where you can launch AWS resources such as EC2 instances, Load Balancers, etc in a virtal network.
5. **AWS Cloud Formation:** CloudFormation allows to use a simple text fie to model and provision, in an automated and secure manner, all the resources needed for applications and environments across all regions and accounts.
6. **AWS CloudWatch:** CloudWatch collects monitoring and operational data in the form of logs, metrics, and events, providing you with a unifed view of AWS resources, applications and services that run on AWS, and on-premises servers. It can also send emails when alers are set for a resource.

Required Sofware /Hardware:

- Internet connection is required.
- A Browser such as Chrome, Edge, Opera to navigate the Web Poral.
- An Operating System supporing Remote Desktop Protocol (RDP) or SSH.

Achieved Cost Saving:

Resource / Cost (in USD)	Quantity and component	Monthly (Cost/Month)	Daily (Cost/Day)	Free Tier (Cost/Month)
Amazon Elastic Compute Cloud (EC2)	2x Web Instances	$6.8200	$0.2273	$0.0000
	1x Database Instance	$3.4100	$0.1137	$0.0000
Amazon Elastic Block Storage	8GB * 2x Web Volumes	$1.8400	$0.0613	$0.0000
	10GB * 1x Database Volume	$1.1400	$0.0380	$0.0000
Amazon Elastic Load Balancer	1x Application Load Balancer	$17.5600	$0.5853	$0.0000
Amazon Virtual Private Cloud	1x VPC	$0.0000	$0.0000	$0.0000
Amazon CloudFormation	1x Stack	$0.0000	$0.0000	$0.0000
Amazon CloudWatch	5-min Basic Monitoring	$0.0000	$0.0000	$0.0000
Additional Charges for Lambda functions and dynamodb	Running Automation Scripts	$1.0000	$0.0333	$0.0000
	Total Cost :	**$31.7700**	**$1.0590**	**$0.0000**

Table 1 : Cost Structure

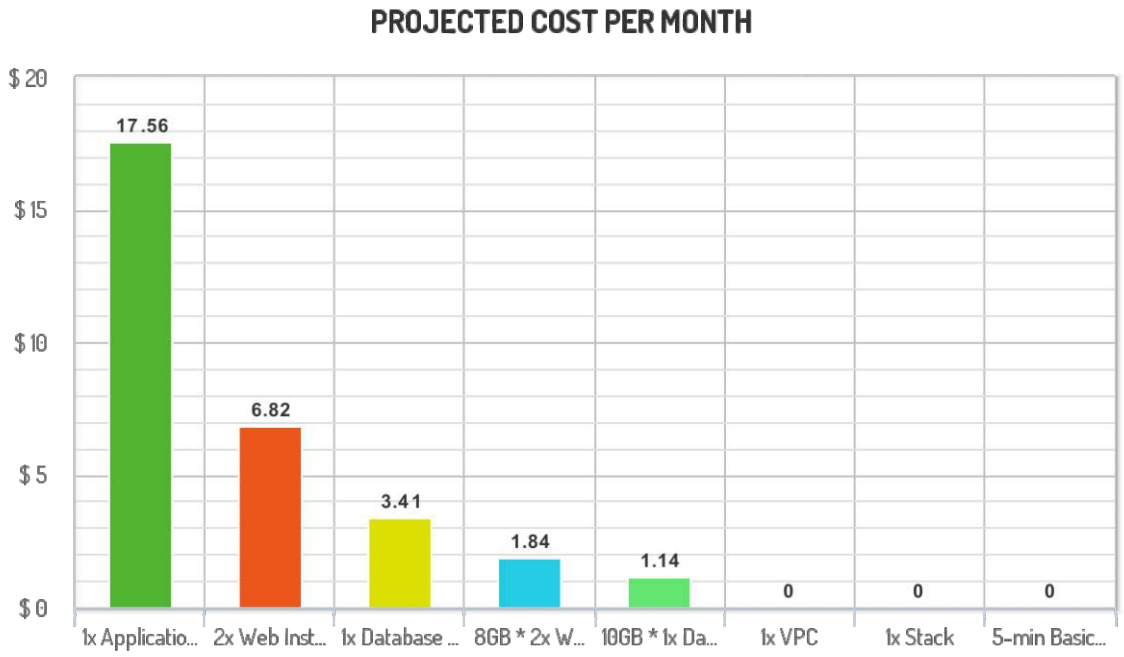


Fig. 1 : Cost per Month

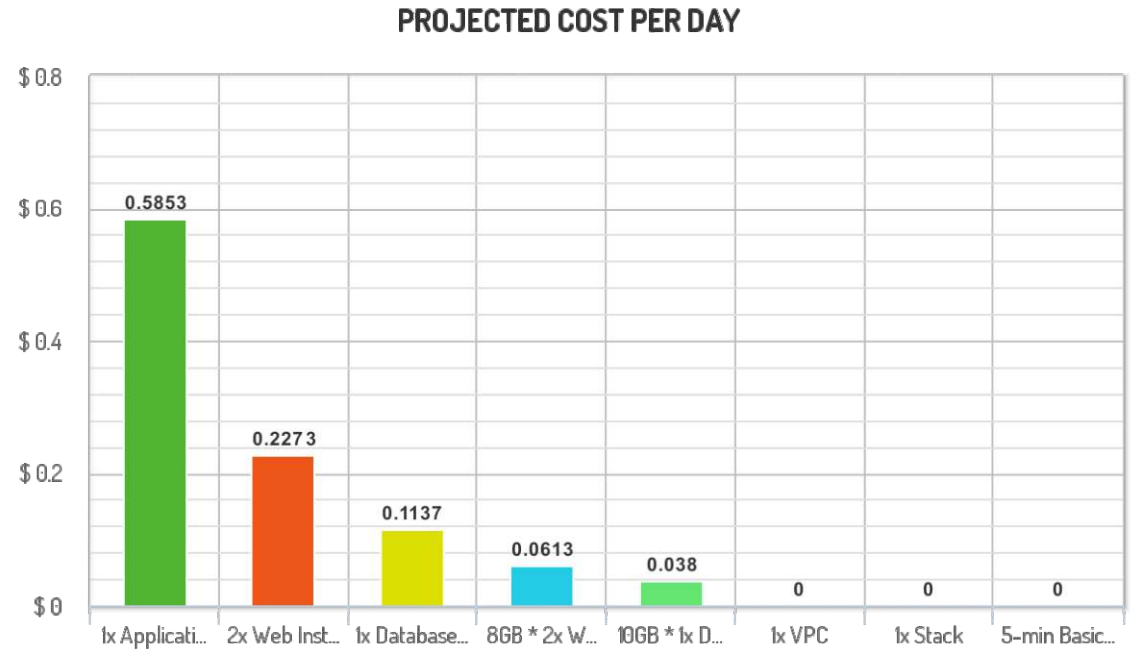


Fig. 2 : Cost per Day

The proposed solution helps in saving a lot of money as compared to on-premise database. The Cloud Computing Solution saves up to 80% cost. It also provides many security and monitoring services free of cost. The user need not to worry about component failure, reliability, scalability and uptime. This solution needs no upfront investment and installation. Using a cloud platf rm allows us to focus on application development rather than maintaining and provisioning resources.

Architecture:

A detailed architecture of the solution is stated below.

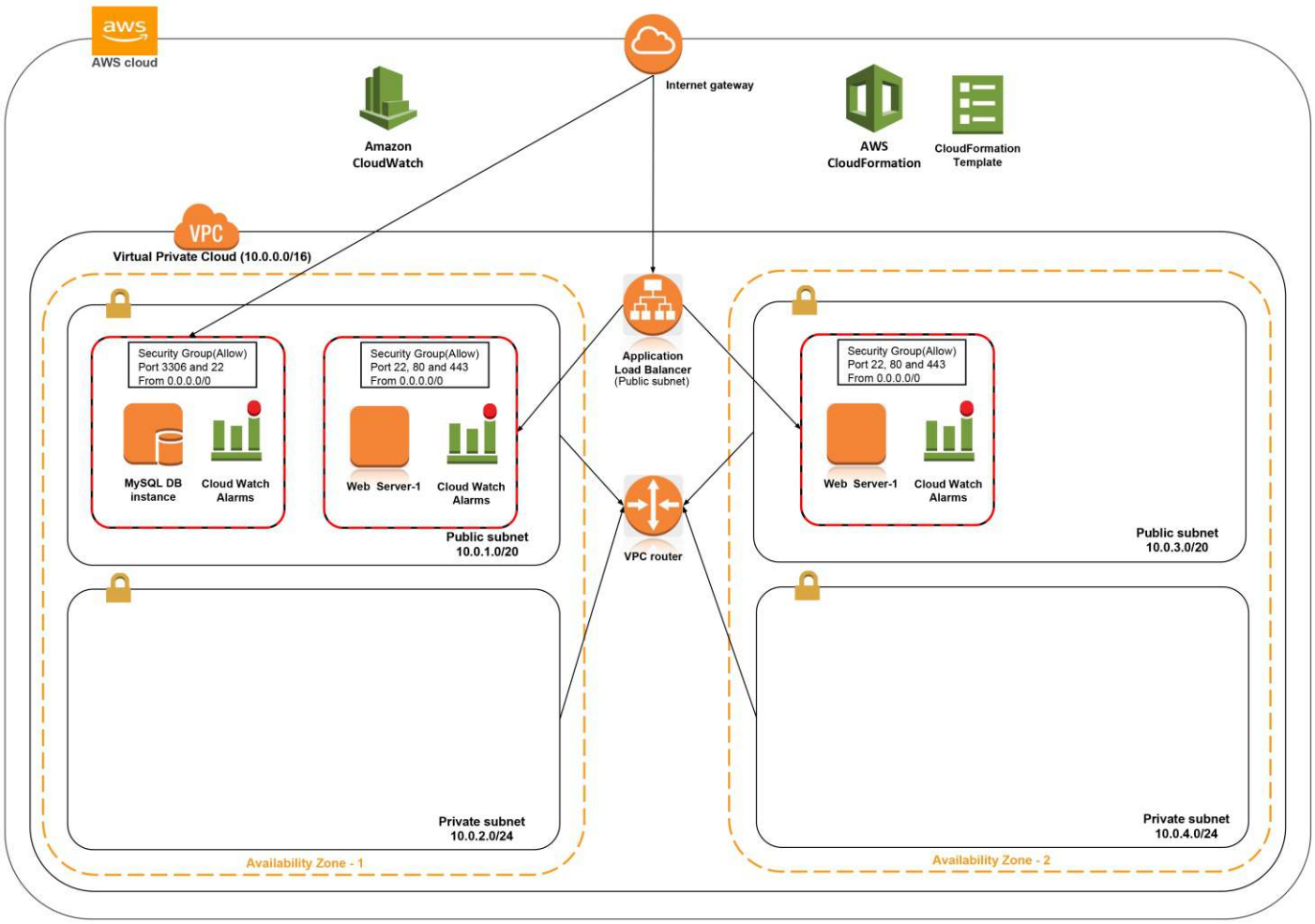


Fig. 3 : Architecture

Solution Brief Description:

The solution leverages many automated and managed cloud services that work in Synergy with each other. It is divided into two phases. Each phase making the experience smartand seamless for the user. In the fst phase, we have used Web Poral as a method to collect information from the user. The user can request to create an environment with just a single click. The web poral is created using many dynamic web frameworks with their own functions and optimizations.

The front end user interace is made using HTML5, CSS3, JavaScript and with Angular.js to create a dynamic and responsive Web Application.

whereas the back-end server uses Node.js Runtime Framework with Express, to render the dynamic content for the user.

The user can perorm the following functions from the pooal.

1. Monitor and view existing application environments.
2. Create a new environment using templates.
3. Create a new custom environment using a creation wizard.
4. Modify, delete and clone the existing environment.

The second phase of the solution is the deployment of the application environment requested by the user.

A user can launch the Synergy application environment by clicking **'Create a new environment'** buton and then choosing Synergy template or creating a custom environment. Synergy environment is deployed on the cloud using Amazon Cloud-Formation Template which convers the given specifcation in a code, to the required stack of resources such as servers, networking, security, and monitoring.

The entire architecture will be deployed on Amazon Web Services Cloud Platorm.

How and what services are used to build the required environment?

1. Amazon VPC:

We startby creating a VPC with CIDR block 10.0.0.0/16 and an internet gateway. Inside that VPC we create a total of 4 subnets in 2 availability zone for high availability i.e. public subnets (CIDR - 10.0.1.0/20 and 10.0.3.0/20) and a private (CIDR - 10.0.2.0/24 and 10.0.4.0/24) subnets. Route tables are created for public subnets and atacching adding internet gateway as a route. Another route table is created for private subnets where NAT Gateway or NAT instance can be atached in future (if required).

2. Amazon Elastic Compute Cloud:

In EC2, we create two Linux Web Servers each with 1 CPU, 1 GB RAM and 8GB of storage with apache HTTP installed using bash scripts in two diferent public subnets. Traf c is allowed on pops 22, po p3389, po, 80 and pond443 from 0.0.0.0/0 (anywhere) as web-server-security-group. Each web server has their own public IPv4 address that can be used to access them from the internet. Scheduled reserved instances can be used to startthe servers at 9 am and stop at 6 pm but they are available in selected regions only. Scheduled Lambda functions are used as an alternative to stop and startthe instances.

We have also created a Linux database server with 1 CPU, 1 GB RAM and 10GB of storage with MySQL server installed using bash scripts in a public subnet. Traf c is allowed on pops 22, po p3389, po, 1403 and pond port 3306 from 0.0.0.0/0 (anywhere). At 6 pm, an amazon lambda function is invoked to create a new backup, delete two days older backups and stop the server. In the morning at 9 am,a lambda function stars the database instance.

3. Amazon Elastic Load Balancer:

Application Load Balancer is created which accepts traf c requests on poport 80 and port443 from 0.0.0.0/0 from anywhere and distributes the requests to the target web servers. Amazon ELB is a managed service i.e. it can scale automatically and perorms a health check on all the instances in the target group to determine if the server can handle the traf c.

4. Amazon CloudWatch:

This service is used to monitor all the resources in AWS and send alers if something crashes or goes above the limit. We have set up two alers i.e. when server CPU average utilization crossing 80% for 2 consecutive intervals of 5 minutes and server instance is going down. In both the cases, an email is sent to the administrator using AWS simple email service (SES). There can also be auto scaling actions based on cloudwatch alarms.

5. Amazon CloudFormation:

This service is used to create stacks from templates of the architecture. Users can create a custom template and CloudFormation will launch that stack in AWS Cloud. A Sample CloudFormation Template for the current architecture is atached at the end of the document .

Scope of Automation:

There is a huge scope of Automation at every level of stack and services that are used.

To illustrate this we have created another architecture which uses managed services and ofers a secure business-critical environment for applications.

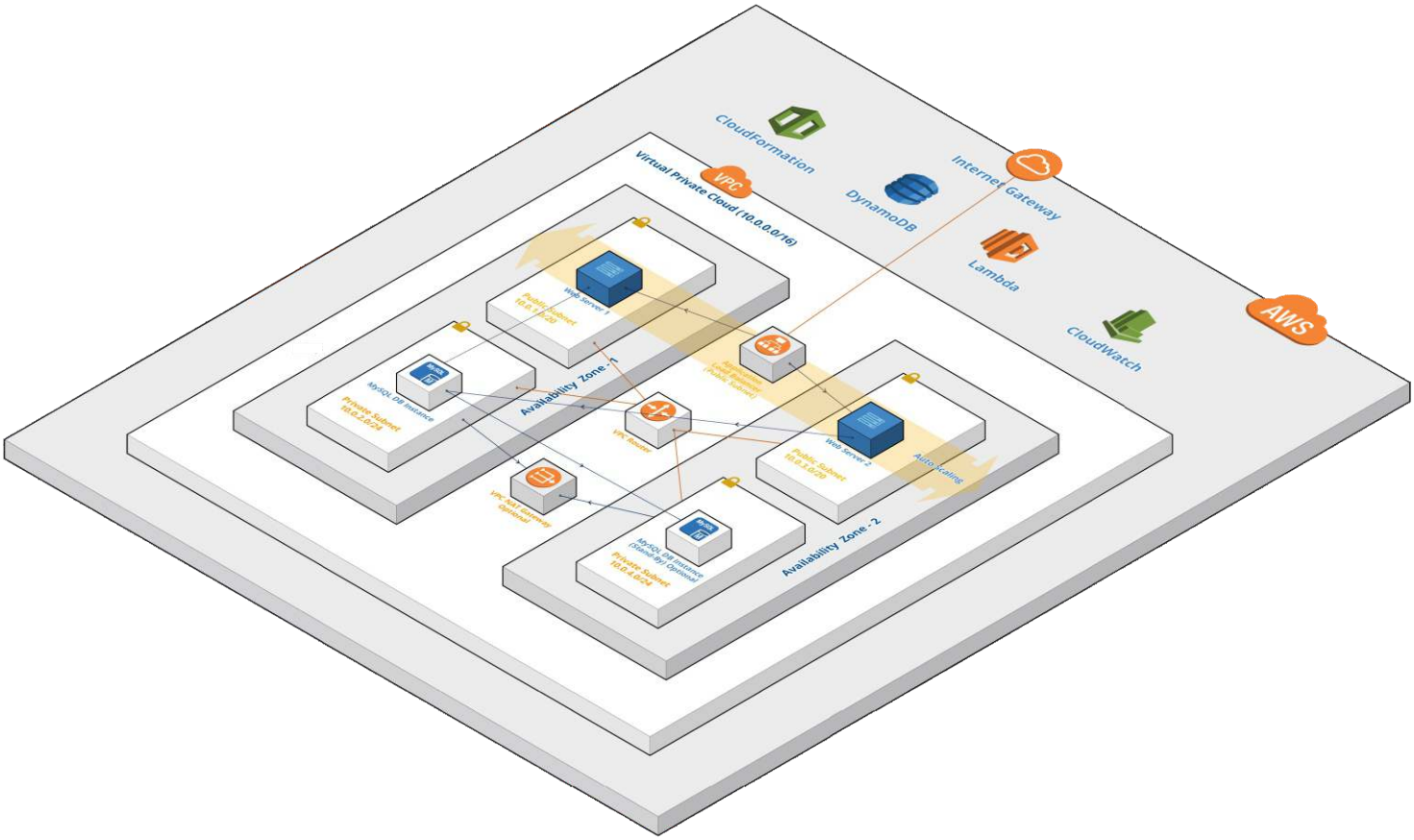


Fig. 4 : Environment using Managed Cloud Services

What are the diferences from the previous architecture?

Compared to the previous architecture, we are using all the appropriate managed services to create the business-critical environment that does not rely on cron jobs or scripts.

1. Automation of database instances: The EC2 database instance can be replaced by using a managed Amazon Relational Database Service (RDS). RDS has inbuilt multi-az, database setup, patching, backups and security at a reasonable cost. It also allows for snapshots and scaling using read replicas.

2. Automation of web server instances: An email is sent to the administrator when server CPU average utilization crosses 80% or a server is going down. In this case, we can automate the process of adding new server instances to the load balancer and replacing the crashed instance with a new instance using Amazon EC2's Auto-Scaling. All that is need is creating an Auto-scaling group with a scaling policy to perorm the above operations.

3. AWS Instance Scheduler: Automatically startand stop Amazon EC2 and Amazon RDS instances. AWS has provided a cloud formation template to implement automatic startand stop. This method solution is to run instances during regular business hours can save up to 70% compared to running those instances 24 hours a day. This method uses Amazon CloudWatch event to trigger Lambda functions.

Fig. 5 : Instance Scheduler Savings

Conclusion:

It is safe to conclude that a menial task like provisioning of resources such as server, networking and hardware components can be really tedious and tiresome which also requires a lot of upfront investment for companies. There is a need to monitor and manage all those resources. All of the above tasks slows down the process of developing applications. These problems can be overcome by leveraging cloud computing platorms which can be used to create a scalable, reliable, secure and cost-ef cient environment with automation at every step. This helps developer and companies focus on creating and managing the applications rather than the provisioning and managing resources.

Team Clustroit