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(Autonomous Institute, Affiliated to VTU)
Bangalore – 560054

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Project Report

SUBMITTED BY
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As part of the internship at ONGC
Term: June-July 2018



Under the Guidance of:
Kamal Kant Singh
Deputy Manager (Programming)
GEOPIC,
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Declaration

I hereby declare that the work presented in this project report entitled “**IDENTIFYING IT ASSETS IN A NETWORK**” is an authentic record of my work carried out from June 11, 2018 to July 10, 2018 under the guidance of Mr. Kamal Kant Singh, Deputy Manager (Programming) at GEOPIC, ONGC, Dehradun.

(Nirvana Dogra)

Acknowledgment

It gives me great pleasure and deep satisfaction in presenting this report of my industrial training undertaken from June 11, 2018 to July 10, 2018 at GEOPIC, ONGC, Dehradun.

I would like to thank ONGC for providing me the opportunity to intern at such a renowned organization. I would also like to take this opportunity to express my sincere gratitude to my mentor, Mr. Kamal Kant Singh, Deputy Manager (Programming), GEOPIC for guiding me during this training.

Certificate

This is to certify that Mr. Nirvana Dogra a Computer Science and Engineering, 2nd year student, at Ramaiah Institute of Technology, Bangalore has done his industrial training at the CS(Software) Division of GEOPIC, ONGC, Dehradun from June 11, 2018 to July 10, 2018.

The report entitled “IDENTIFYING IT ASSETS IN A NETWORK” embodies the work done during the internship.

(Kamal Kant Singh)

About ONGC

ONGC – Oil and Natural Gas Corporation Limited – The Largest Energy Company in India

Maharatna ONGC is the largest **crude oil and natural gas Company in India**, contributing around 70 percent to Indian domestic production. Crude oil is the raw material used by downstream companies like IOC, BPCL, and HPCL to produce petroleum products like Petrol, Diesel, Kerosene, Naphtha, and Cooking Gas-LPG.

ONGC Videsh is a wholly owned subsidiary of Oil and Natural Gas Corporation Limited (ONGC), the National Oil Company of India, and is India's largest international oil and gas Company. ONGC Videsh has participation in 41 projects in 20 countries namely Azerbaijan, Bangladesh, Brazil, Colombia, Iraq, Israel, Iran, Kazakhstan, Libya, Mozambique, Myanmar, Namibia, Russia, South Sudan, Sudan, Syria, United Arab Emirates, Venezuela, Vietnam and New Zealand. ONGC Videsh maintains a balanced portfolio of 15 producing, 4 discovered/under development, 18 exploratory, and 4 pipeline projects. The Company currently operates/ jointly operates 21 projects. ONGC Videsh had total oil and gas reserves (2P) of about 711 MMTOE as of April 1, 2018.

Global ranking

- ONGC received Dun & Bradstreet Award 2018 in the 'Oil and Gas Exploration' category
- ONGC received 4 PSE Excellence Awards from Indian Chamber of Commerce in 2016
- This **Top Energy Company in India**, ranked 11th globally as per Platts Top 250 Global Energy Rankings, 2017
- Ranked 464 in the Newsweek Green Rankings World's Greenest Companies 2016
- Ranked 14th among global Oil and Gas Operations industry in Forbes Global 2000 list, 2017 of the World's biggest companies for 2017; Ranked 443 in the overall list, 2017 - based on Sales (US\$ 19.89 billion), 288 on Profits, 470 in Assets and 300 Market Value.
- Ranked 26 in 'Transparency in Corporate Reporting' among the world's 124 largest listed companies published by Transparency International, 2014(Up from 39 in 2012).

Vision and Mission

Vision

To be global leader in integrated energy business through sustainable growth, knowledge excellence and exemplary governance practices.

Mission

World Class

- Dedicated to excellence by leveraging competitive advantages in R&D and technology with involved people.
- Imbibe high standards of business ethics and organizational values.
- Abiding commitment to safety, health and environment to enrich quality of community life.
- Foster a culture of trust, openness and mutual concern to make working a stimulating and challenging experience for our people.
- Strive for customer delight through quality products and services.

Integrated In Energy Business

- Focus on domestic and international oil and gas exploration and production business opportunities.
- Provide value linkages in other sectors of energy business.
- Create growth opportunities and maximize shareholder value.

Dominant Indian Leadership

- Retain dominant position in Indian petroleum sector and enhance India's energy availability.

Perspective Plan 2030 (PP2030)

PP2030 charts the roadmap for ONGC's growth over the next two decades. It aims to double ONGC's production over the plan period with 4-5 per cent growth against the present growth rate of 2 percent. In physical terms the aspirations under Perspective Plan 2030 aims for -

- Production of 130 MMTOE of oil and oil equivalent gas (O + OEG) per year and accretion of over 1,300 MMTOE of proven reserves.
- Grow ONGC Videsh Limited (OVL) six fold to 60 MMTOE of international O+OEG production per year by 2030.
- More than 20 MMTOE of O+OEG production per year in India coming from new unconventional sources such as shale gas, CBM, deepwater and HPHT (High Pressure & High Temperature) reservoirs.
- Over 6.5 GW power generations from nuclear, solar and wind and 9 MTPA of LNG.
- Scaling up refining capacity to over 20 MMTPA and targeted investments to capture downstream integration in petrochemicals.

About GEOPIC

GEOPIC at Dehradun was established in 1987 to cater to the specialized needs of seismic data processing and interpretation of ONGC. It is the largest computing facilities with dedicated state-of-the-art infrastructure and specialists in the fields of seismic data processing, geoscientific data interpretation, and software development. Land and marine seismic data of ONGC is processed and interpreted synergistically at this center to unravel the structural and stratigraphic complexities of the subsurface. GEOPIC processes one of the finest capabilities in the world in the area of data evaluation, as is evident from its success rate of 54% for exploratory wells. The Vision & Mission: To become a global player in providing geoscientific solutions to E&P problems. GEOPIC's mission is the computer-aided exploration and reservoir description by integrating seismic with other geoscientific data. Services from GEOPIC: 1. Seismic & Log data interpretation—Computer-aided 3D data interpretation, interactive interpretation techniques 87 2. Seismic data processing—2D & 3D seismic data processing, customized re-processing, optimal utilization of resources and special processing. 3. Seismic software development—Dip & Azimuth Transformation Software (DATS), Post stack 3D cross line statics, 3D seismic survey design, Corporate serve estimation, vigilance Information system (VIS) 4. Business Development—Consultancy training in the field of seismic data processing and interpretation has been imparted to oil industry professionals from Iraq, Tanzania, Uganda, and Vietnam.

Abstract

The aim of this project was to identify the IT assets present in a network. Through this application, the user will be able to discover all the remote devices that are connected to the host and will further be able to get more details about the devices.

The user will enter a range of IP for which the information needs to be gathered. Once the range has been enter, the application will be able to ping the various IP's and tell the user if a particular IP is currently on the same connection or not. Further, the user will be able to click on individual IP to get a detailed information about the remote device's configuration. The application will also save the discovered configuration of a particular device and will provide a notification if any changes are made.

Need for an IT identification system

This application provides the administrator information of all the remote devices connected to the host. It also allows the administrator to gain an insight on all the devices that are attached and even keep them aware of any new addition or changes in the device configuration. The application will also help in detecting any unaccounted device that might be accessing the server.

Tools Used

1. **XAMPP:** It is a simple, lightweight Apache distribution that makes it extremely easy for developers to create a local web server for testing and deployment purposes. XAMPP is also cross-platform, which means it works equally well on Linux, Mac, and Windows. Since most actual web server deployments use the same components as XAMPP, it makes transitioning from a local test server to a live server extremely easy as well.
2. **Visual Studio Code:** Visual Studio Code is a source code editor developed by Microsoft for Windows, Linux, and macOS. It includes support for debugging, embedded Git control, syntax highlighting, intelligent code completion, snippets, and code refactoring

Project Technical Details

Software Requirements:-

1. Operating System: Windows / Ubuntu
2. Development language: HTML, CSS, PHP
3. Scripting Environment: Command Prompt, PowerShell, Bash Shell

The database is saved in a text file and the webpage was tested on chrome/Opera

Bash: It is a UNIX shell and command language. The Bash command syntax is a superset of the Bourne shell command syntax. Bash's syntax has many extensions lacking in the Bourne shell. Bash supplies "conditional execution" command separators that make execution of a command contingent on the exit code set by a precedent command. Some versions of UNIX and Linux contain Bash system start-up scripts, generally under the /etc directories.

HTML: It is the standard markup language for creating web pages and web applications. With Cascading Style Sheets (CSS) and JavaScript, it forms a triad of cornerstone technologies for the World Wide Web. Web browsers receive HTML documents from a web server or from local storage and render the documents into multimedia web pages. HTML describes the structure of a web page semantically and originally included cues for the appearance of the document.

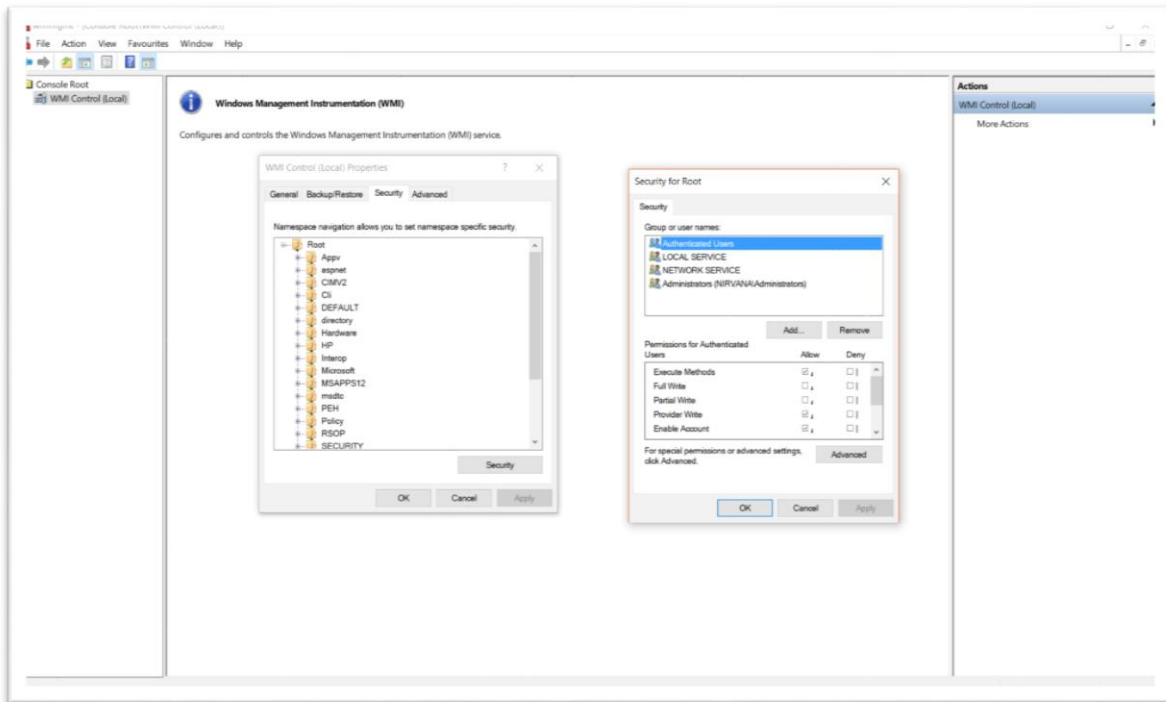
CSS: It is a style sheet language used for describing the presentation of a document written in a markup language like HTML. CSS is designed to enable the separation of presentation and content, including layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple web pages to share formatting by specifying the relevant CSS in a separate .css file and reduce complexity and repetition in the structural content.

PowerShell: It is a task automation and configuration management framework from Microsoft, consisting of a command-line shell and associated scripting language

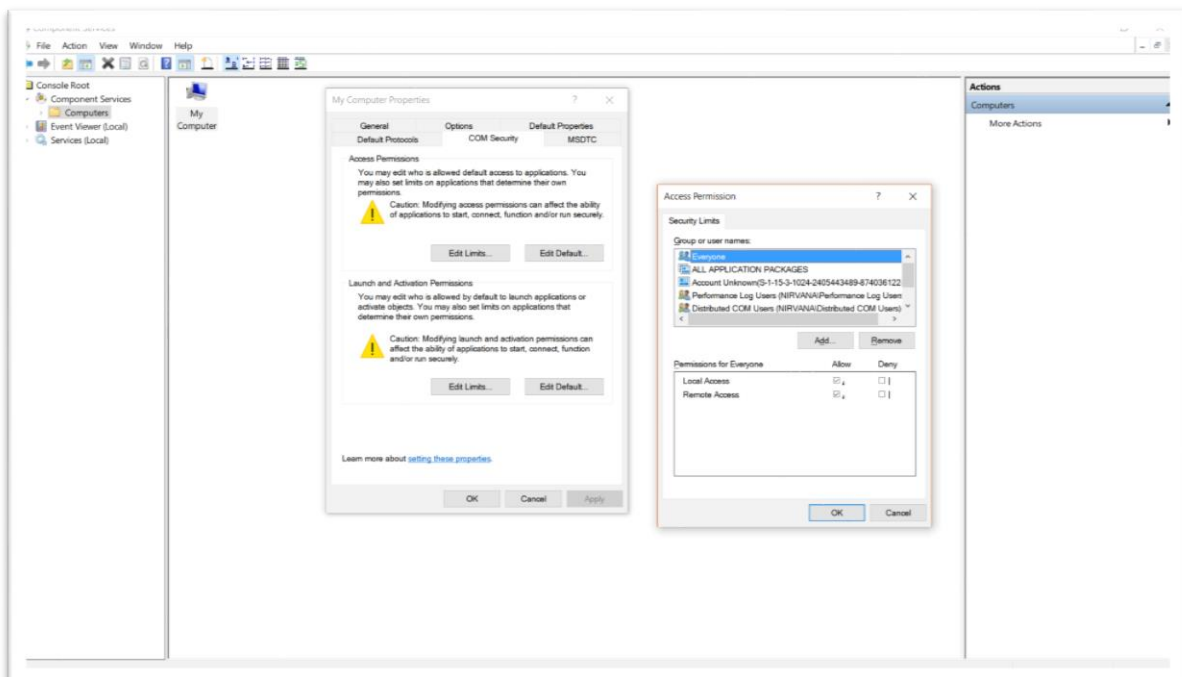
PHP: PHP is a scripting language designed to fill the gap between SSI (Server Side Includes) and Perl, intended for the web environment. Its principal application is the implementation of web pages having dynamic content. PHP has gained quite a following in recent times, and it is one of the frontrunners in the Open Source software movement.

Pre-Project Configuration

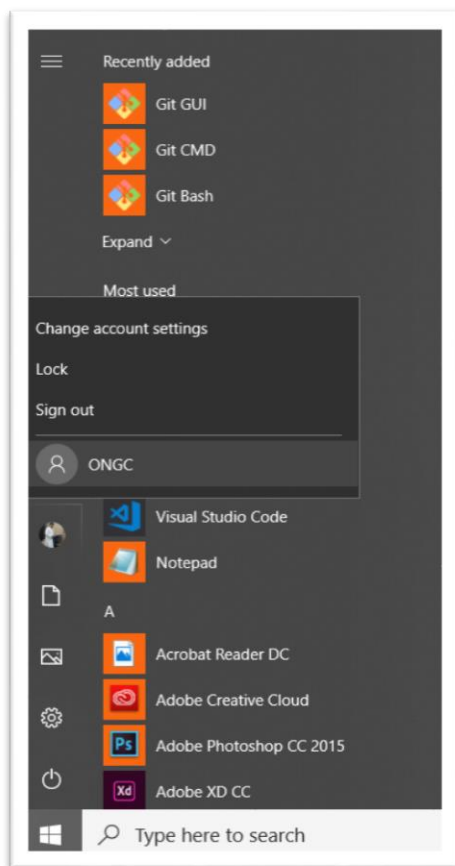
1) **WMI Settings:** These setting enable me to use wmi commands remotely on a computer.



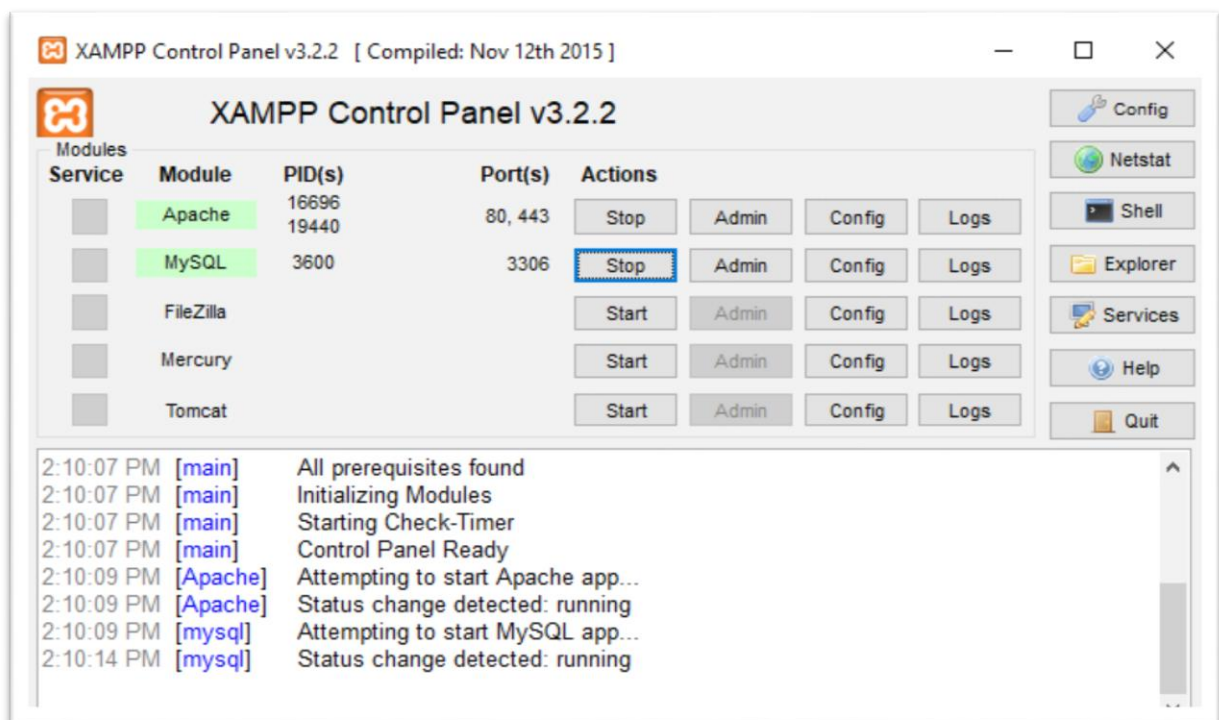
2) **Dcomcnfg Settings:** These settings served a similar purpose that was to enable running commands remotely on a computer



3) Creating an ONGC admin account:

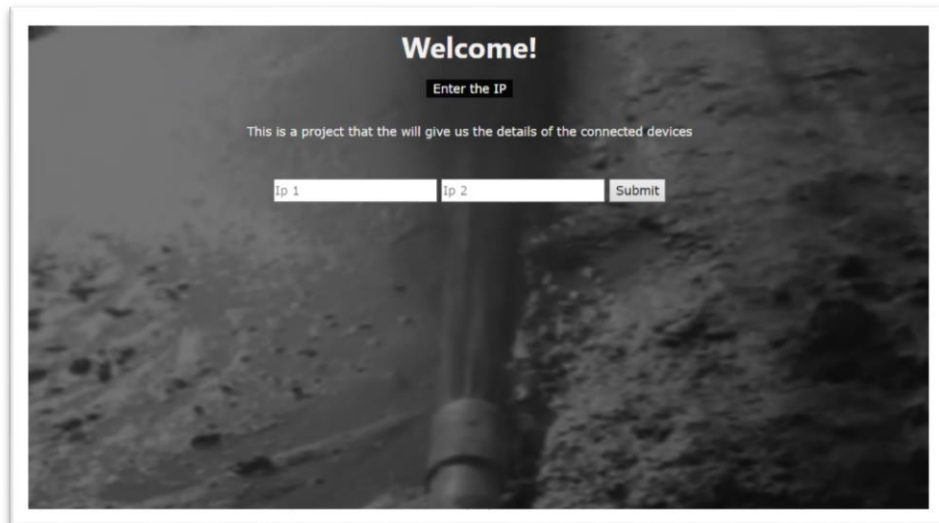


4) Xampp Start-up:

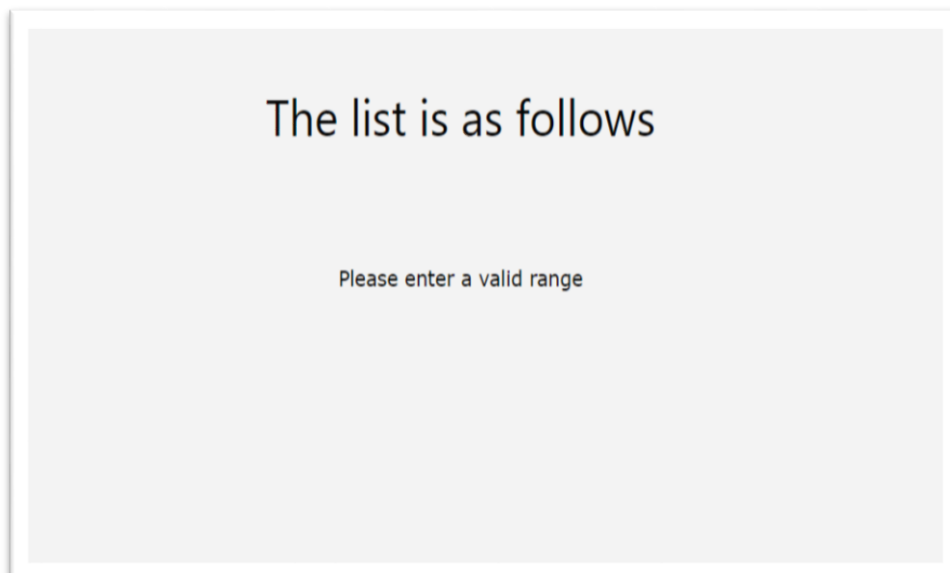


Project Description

- 1) **Starting page:** The starting page has two boxes to take a input for the range of IPs to be searched. The user is intended to enter the IPs. The background has a video playing on a loop. Also, if the user enters an incorrect IP an error is displayed.



An error message is displayed if an incorrect IP range is entered.

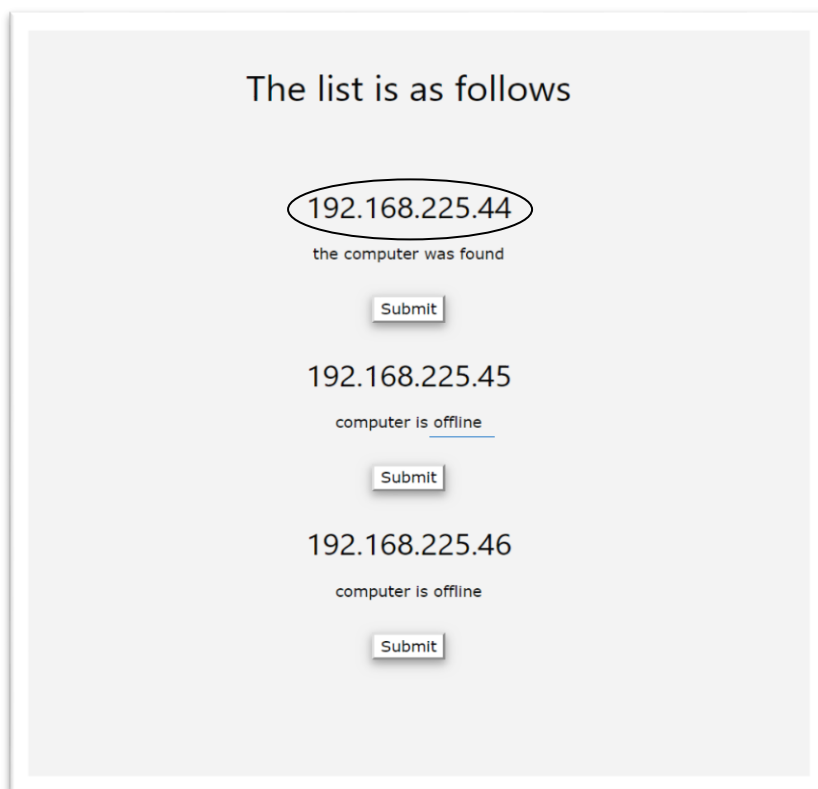
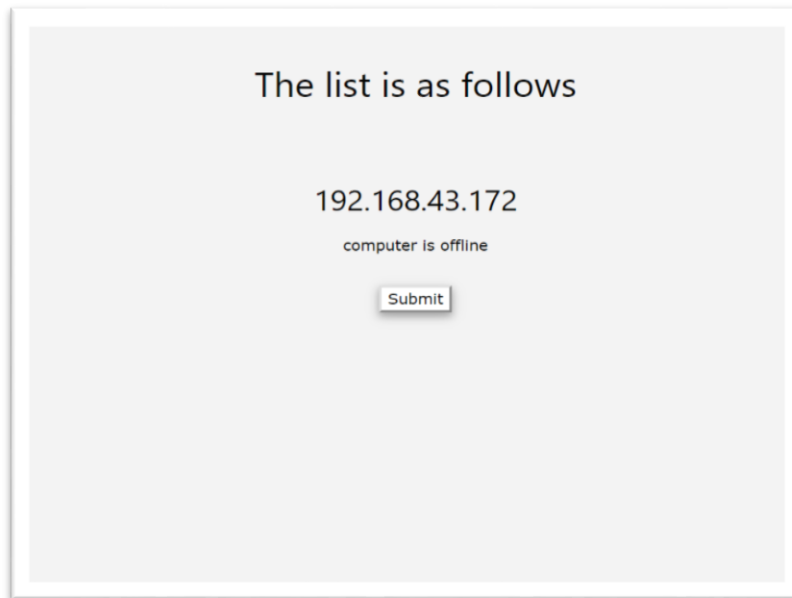


- **File.html**

```
1. <!DOCTYPE html>
2. <html >
3.     <!-- giving style -->
4.     <head>
5.         <meta name="viewport" content="width=device-width, initial-scale=1">
6.         <style>
7.
8.
9.             body {
10.                 margin: 0;
11.                 font-family: Arial;
12.                 font-size: 17px;
13.             }
14.
15.             #myVideo {
16.                 position: fixed;
17.                 right: 0;
18.                 bottom: 0;
19.                 min-width: 100%;
20.                 min-height: 100%;
21.             }
22.
23.             .content {
24.                 position: fixed;
25.                 bottom: 0;
26.                 min-width: 100%;
27.                 max-height: 100%;
28.                 background: rgba(0, 0, 0, 0.5);
29.                 color: #f1f1f1;
30.                 width: 100%;
31.                 padding-bottom: 50%;
32.             }
33.         </style>
34.     </head>
35.     <!-- The video -->
36.     <video autoplay muted loop id="myVideo">
37.         <source src="ONGCvid.mp4" type="video/mp4">
38.     </video>
39.     <!-- Text overlaying the video -->
40.     <link rel="stylesheet" href="https://www.w3schools.com/w3css/4/w3.css">
41.     <div class="content">
42.         <header class="w3-container w3-center">
```

```
43.         <h1><b>Welcome!</b></h1>
44.         <p> <span class="w3-tag">Enter the IP</span></p>
45.     </header>
46.     <body class="w3-light-grey">
47.         <p class="w3-container w3-
center">This is a project that the will give us the details of the connected devic
es</p>
48.         <form class="w3-container w3-center w3-padding-
32" action="Devices.php" method="post">
49.             <input type="text" name="First" placeholder="Ip 1" />
50.
51.             <input type="text" name="second" placeholder="Ip 2" />
52.             <!-- Button -->
53.             <input type="submit" name="submit" />
54.         </form>
55.
56.     </body>
57. </div>
58. </html>
59.
```

- 2) **Live devices page:** This page gives the status of a particular IP. The page pings to each IP to check if a device is connected or not. Through this, the user gets to know which all devices are connected to the server.



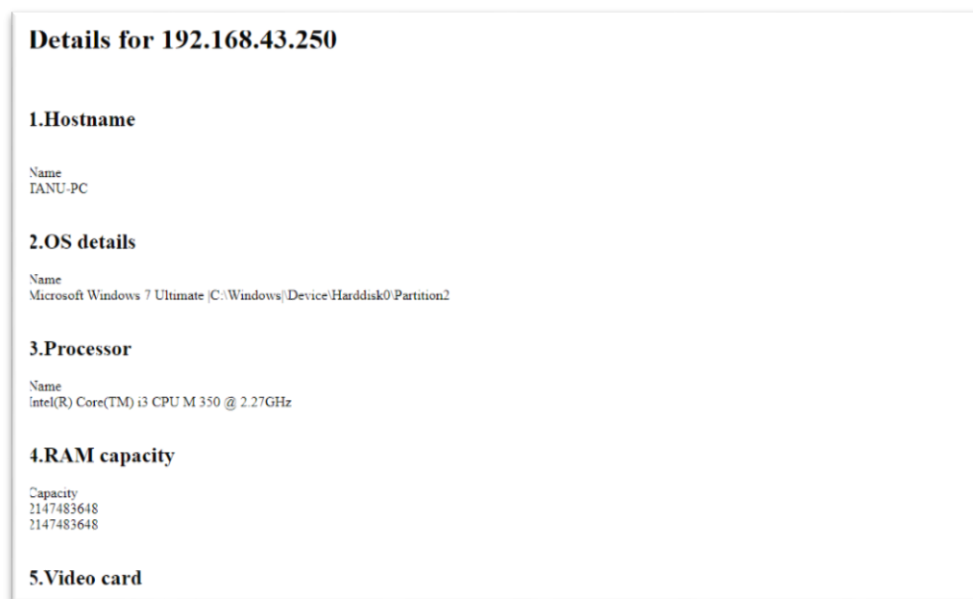
- **Devices.php**

```
1. <html class="w3-light-grey">
2. <link rel="stylesheet" href="https://www.w3schools.com/w3css/4/w3.css">
3. <?php
4. echo '<h1 class="w3-container w3-center w3-padding-32">The list is as follows</h1><br>';
5.
6. //check if the submit button was clicked by the user
7. if ( (isset( $_POST['submit'] )) ){
8.     // retrieve the form data by using the element's name attributes value as key
9.     $val1 = $_REQUEST['First'];
10.    $val2 = $_REQUEST['second'];
11.
12.    //getting long value to be use in a for loop
13.    // $start = ip2long($val1);
14.    $start = sprintf('%u', ip2long($val1));
15.    $end = sprintf('%u', ip2long($val2));
16.
17.    // $end = ip2long($val2);
18.
19.    if(!$start || !$end) {
20.        //will give me a negative value in case of incorrect value
21.        die('<p class="w3-container w3-center">Please enter a valid range</p>');
22.    }
23.    else{
24.        pingAllIP($start, $end);
25.    }
26. }
27. function pingAllIP($start, $end)
28. {
29.     //echo($start);
30.     //going through the entire IP range
31.     for($i=$start; $i<=$end; $i++){
32.         $ip=long2ip($i);
33.         echo '<h2 class="w3-container w3-center"> ',
34.             "$ip</h2>";
35.
36.
37.         exec("ping -n 1 " . $i, $output, $result);
38.
39.         if (strpos($output[5], 'Packets: Sent = 1, Received = 1, Lost = 0 (0% loss)')
            && strpos($output[2], 'Destination host unreachable') ==FALSE) {
40.             echo '<p class="w3-container w3-center">the computer was found<p>';
```

```
41.
42.     }
43.     else{echo '<p class="w3-container w3-center">computer is offline<p>';}
44.     //printhing button
45.     echo '<form class="w3-container w3-
center " action="getDetails.php" method="post">',
46.         '<input type="hidden" value=".' . $ip . ' " name="IP" />',
47.         '<input class="w3-card-4 w3-margin w3-
white" type="submit" name="submit" />',
48.         '</form>' ;
49.
50.     $output="";
51.
52.     }
53.
54.
55. }
56. ?>
57. </html>
```

3) Device details: This page gets the details of the devices that are connected. It gives us the following details.

- Hostname
- OS name and version details
- Processor details
- RAM capacity
- Video card details, if any
- Local file system/disk drives
- Mounted network file systems
- Available Users
- Attached Devices
- System Serial Number



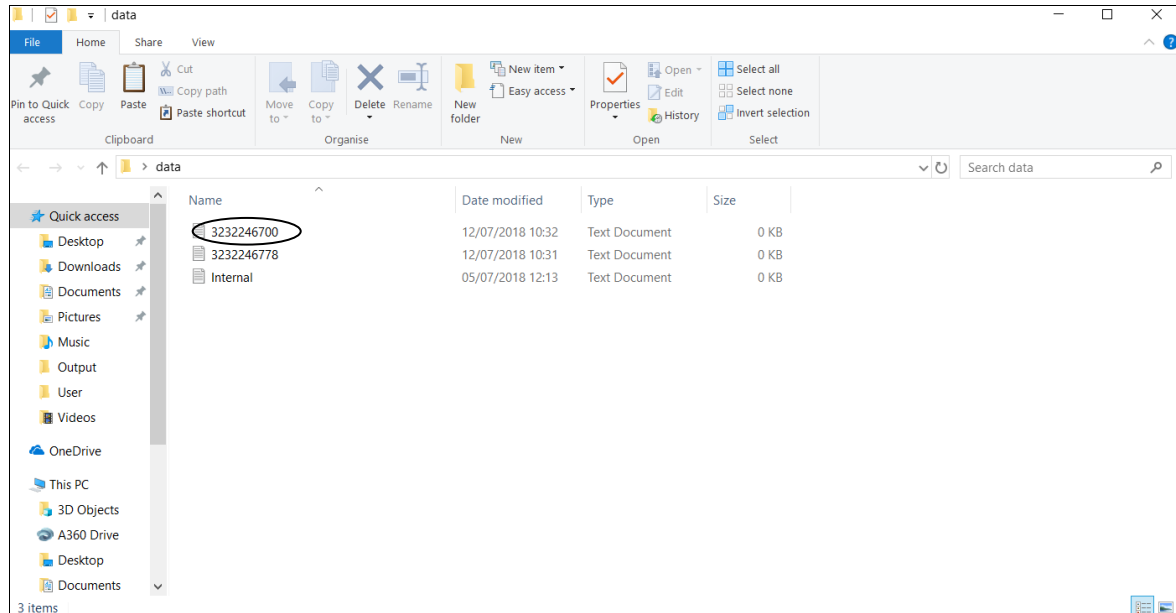
Further, the page also lets the user know of any changes in devices.

```
THEIR IS A CHANGE IN THE DEVICEComparing files C:\USERS\ONGC\DESKTOP\DATA\3232246778.txt and C:\USERS\ONGC\DESKTOP\DATA\INTERNAL.TXT
**** C:\USERS\ONGC\DESKTOP\DATA\3232246778.txt

192.168.43.250
1)
2)
3)
4)
5)
6)
7)
8)
9)
10)
**** C:\USERS\ONGC\DESKTOP\DATA\INTERNAL.TXT
****
```

The database is saved in the following way

The file names are same as the IP of the device represented in a long form using ‘ip2long()’ function provided as a built in function in PHP



- **GetDetails.php**

```
1. <html>
2.     <head>
3.         <title>Info Page</title>
4.     </head>
5.     <body>
6.         <?php
7.             set_time_limit(0);
8.             $ip = $_POST['IP'];
9.             echo "<h1>Details for " . $ip . "</h1>";
10.            echo "<br />";
11.            $val = sprintf('%u', ip2long($ip));
12.            $path = "C:\Users\ONGC\Desktop\User\\" . $val . ".txt";
13.            $txt = "";
14.
15.            //opening a preexistant file already dicovered
16.            if (file_exists($path)) {
17.                $myfile = fopen("$path", 'r') or die("<p><b>file not existant</b></p>");
18.                $data = fread($myfile, filesize($path));
19.                $tr = getOutput($ip);
20.                $path1 = "C:\Users\ONGC\Desktop\User\Internal.txt";
21.                $myfile = fopen("$path1", "w") or ("internal error");
22.                exec("FC $path $path1", $change, $status);
23.
24.                //comparing the new results to the old
25.                if ($change) {
26.                    echo ("<h><b>THEIR IS A CHANGE IN THE DEVICE</b></h>");
27.                    foreach($change as $key => $value){
28.                        echo $value . "<br />";
29.                    }
30.                }
31.            }
32.            else{
33.                //creating a new file
34.                $myfile = fopen("$path", "w") or die("Unable to create a file");
35.                $tr = getOutput($ip);
36.                fwrite($myfile, $tr);
37.                fclose($myfile);
38.            }
39.
40.            function getOutput($ip){
41.                echo "<h2>1.Hostname</h2>";
```



```

42.     exec("wmic /node:" . $ip . " /user:ongc /password:ongc computersystem get na
me", $outcome1, $status);
43.     displayResult($outcome1);
44.
45.
46.     echo "<h2>2.OS details</h2>";
47.     exec("wmic /node:" . $ip . " get name", $outcome2, $status);
48.     displayResult($outcome2);
49.
50.     echo "<h2>3.Processor</h2>";
51.     exec("wmic /node:" . $ip . " /user:ongc /password:ongc cpu get name", $outco
me3, $status);
52.     displayResult($outcome3);
53.
54.     echo "<h2>4.RAM capacity</h2>";
55.     exec("wmic /node:" . $ip . " /user:ongc /password:ongc memorychip get capaci
ty", $outcome4, $status);
56.     displayResult($outcome4);
57.
58.     echo "<h2>5.Video card</h2>";
59.     exec("powershell C:\xampp\htdocs\Output\video.ps1", $outcome5, $status);
60.     if (is_null($outcome5)) {
61.         echo "NULL";
62.     }
63.     else{
64.         $val = implode($outcome5);
65.         echo "yes $val ";
66.         displayResult($outcome5);
67.     }
68.
69.     echo "<h2>6.Disk drives</h2>";
70.     exec("wmic /node:" . $ip . " /user:ongc /password:ongc logicaldisk get devic
eid,filesystem", $outcome6, $status);
71.     displayResult($outcome6);
72.
73.     echo "<h2>7.Mounted NFS</h2>";
74.     exec("wmic /node:" . $ip . " /user:ongc /password:ongc win32_mappedlogicaldi
sk get filesystem", $outcome7, $status);
75.     if (is_null($outcome7)) {
76.         echo "NULL";
77.     }
78.     else{
79.         $val = implode($outcome7);
80.         echo "yes $val ";

```

```

81.         displayResult($outcome7);
82.     }
83.
84.     echo "<h2>8.Users</h2>";
85.     exec("wmic /node:" . $ip . " /user:ongc /password:ongc useraccount get name"
, $outcome8, $status);
86.     displayResult($outcome8);
87.
88.     echo "<h2>9.Attached devices</h2>";
89.     exec("wmic /node:" . $ip . " /user:ongc /password:ongc win32_mappedlogicaldi
sk get filesystem", $outcome9, $status);
90.     displayResult($outcome9);
91.
92.     echo "<h2>10.Serial Number</h2>";
93.     exec("wmic /node:" . $ip . " /user:ongc /password:ongc bios get serialnumber
", $outcome10, $status);
94.     displayResult($outcome10);
95.
96.     $txt = "\r\n" . $ip . "\r\n1)" . implode($outcome1) . "\r\n2)" . implode($ou
tcome2) . "\r\n3)" . implode($outcome3) . "\r\n4)" . implode($outcome4) . "\r\n5)"
. implode($outcome5) . "\r\n6)" . implode($outcome6) . "\r\n7)" . implode($outcome7
) . "\r\n8)" . implode($outcome8) . "\r\n9)" . implode($outcome9) . "\r\n10)" . imp
lode($outcome10);
97.     return $txt;
98. }
99.
100.    function displayResult($outcome)
101.    {
102.        foreach($outcome10 as $key => $value){
103.            echo $value . "<br />";
104.        }
105.    }
106.
107.    // $servername = "localhost";
108.    // $username = "";
109.    // $password = "password";
110.    // // Create connection
111.    // $conn = new mysqli($servername, $username, $password);
112.    // // Check connection
113.    // if ($conn->connect_error) {
114.    //     die("Connection failed: " . $conn->connect_error);
115.    // }
116.    // echo "Connected successfully";
117.    // $user='root';

```

```
118.          // $pass= '';
119.          // $db= 'testdb';
120.          // $db = new mysqli('localhost', $user, $db) or die("Unable to connect"
    );
121.          // echo "great work";
122.          // $sql = "INSERT INTO mywork (hostname, OS, processor, ram, videocard,
    diskdrives, NFS, users, attachedDevices, serialno)
123.          // VALUES ('abc','fbfg', $outcome3, $outcome4, $outcome5, $outcome6, $o
    utcome7, $outcome8, $outcome9, $outcome10)";
124.          // if (mysqli_query($conn, $sql)) {
125.          //     echo "New record created successfully";
126.          // } else {
127.          //     echo "Error: " . $sql . "<br />" . mysqli_error($conn);
128.          // }
129.          // mysqli_close($conn);
130.
131.          ?>
132.          </body>
133.          </html>
134.
135.
```

Information acquired during the study

During the development of the project, a knowledge of PowerShell, command prompt (DOS shell), PHP, HTML, and CSS was gained.

The commands user have been mentioned below:

Command Prompt Commands

- 1) Ping -n 1=> Pings the localhost, which helps determine if the computer can send information out and receive the information back from itself.
- 2) arp -a => Address Resolution Protocol (**ARP**) used to find all connected devices.
- 3) ipconfig => Used to find IPv4 of a device

Power Shell Commands

Learned about a few 'wmi' commands. This was important to get the various details about the connected devices. The following 'wmi' commands were used in the project.

- 1) **wmic OS get Caption,CSDVersion,OSArchitecture,Version**
- 2) **wmic BIOS get Manufacturer,Name,SMBIOSBIOSVersion,Version**
- 3) **wmic CPU get Name,NumberOfCores,NumberOfLogicalProcessors**
- 4) **wmic MEMPHYSICAL get MaxCapacity**
- 5) **wmic USERACCOUNT get Caption,Name>PasswordRequired**
- 6) **wmic path win32_physicalmedia get SerialNumber**

Precaution while development

While the development of the project a considerable amount of focus was given to writing a readable code and maintaining good practices. Following were few of the things that were kept in mind during the course of development.

- 1) Commenting
- 2) Consistent indentation
- 3) Avoid obvious comments
- 4) Code grouping
- 5) Consistent name scheming
- 6) DRY(Do not repeat yourself) principles

Future scope for improvement:

The following are the points that can be improved.

- 1) The database can be made in SQL that will allow a better management of data.
- 2) Frameworks like 'Flask' can be used instead of PHP. Such framework can the process of retrieving data more efficient.
- 3) The application can further help the management decide about the investment that needs to be made in hardware or software by telling the company, the current status of computers in an organization
- 4) The application can give an insight to employer about the work ethics of an employee.
- 5) The application can also help the management to remotely shut down or backup data.

Conclusion

One can now easily create a local server allowing various devices to open a webpage hosted. Further, the administrator handling the host computer can find a detailed configuration about these devices. A fair amount of knowledge about PowerShell, Bash, HTML, CSS and PHP has also been gained during the internship.

Bibliography

- 1) W3schools
- 2) Php.net
- 3) Sourceforge.net
- 4) Various open source platforms