GOVERNMENT POLYTECHNIC, KOLHAPUR

A MICRO PROJECT REPORT IN

NETWORK ADMINISTRATION

(ITG401)

A MICRO PROJECT REPORT ON

-- ZENMAP --

SUBMITTED TOWARDS THE

PARTIAL FULFILLMENT FOR 5th SEMESTER OF

Diploma In Engineering (Information Technology)

SUBMITTED BY :

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GOVERNMENT POLYTECHNIC KOLHAPUR

DEPARTMENT OF INFORMATION TECHNOLOGY

CERTIFICATE

This is to certify that the Micro Project Report Entitled

-- ZENMAP –

Submitted By:

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successfully completed above entitled Micro-Project in the Course of **ITG401-NETWORK ADMINISTRATION** in the 5th semester during his tenure of completing the Diploma in Information Technology.

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Abstract

Network administration is a critical function in the realm of information technology, responsible for ensuring the reliability, security, and efficiency of computer networks. The increasing complexity and diversity of networks present unique challenges to network administrators. This project introduces Zenmap, a user-friendly graphical interface for Nmap, as a powerful tool to enhance network administration practices.

The motivation behind this project is rooted in the necessity for effective network administration solutions that simplify the process of network monitoring, vulnerability assessment, and security enhancement. Zenmap provides a promising avenue to streamline network administration tasks and bolster network security.

This project aims to achieve several outcomes, including:

1. Introducing Zenmap as a valuable tool for network administrators by highlighting its features and capabilities.
2. Demonstrating the practical application of Zenmap in real-world network administration scenarios, including network discovery, vulnerability assessment, and security monitoring.
3. Providing insights into how Zenmap can contribute to network security enhancement and performance optimization.
4. Offering guidance on the integration of Zenmap into existing network administration workflows and toolsets.
5. Equipping network administrators and security professionals with the knowledge and skills to harness Zenmap effectively in their daily network management tasks.

The innovation lies in the application of Zenmap to address the challenges faced by network administrators. By providing an intuitive interface for Nmap's powerful scanning capabilities, Zenmap streamlines the process of network scanning and vulnerability assessment.. The project's innovative approach enhances network administration practices and contributes to the ongoing efforts to fortify network security.

MICRO-PROJECT PROPOSAL

Aim/Benefits of the Micoproject -

Aim: The aim of this micro-project is to organize a workshop focused on utilizing Zenmap for network security assessment. This workshop will target network administrators, security professionals, and IT enthusiasts, providing them with practical skills to enhance network security and administration using Zenmap.

Benefits:

1. **Skill Enhancement:** The workshop will equip participants with practical skills in network scanning, vulnerability assessment, and network administration using Zenmap. Participants will learn how to use this powerful tool effectively.
2. **Enhanced Network Security:** By learning to leverage Zenmap for network scanning and vulnerability assessment, participants will be better equipped to identify and mitigate security weaknesses within their networks, leading to improved security.
3. **Efficient Network Administration:** Participants will gain insights into how Zenmap can streamline network administration tasks, making network management more efficient and effective.
4. **Cost Savings:** Improved security and efficiency can lead to cost savings by reducing the risk of network breaches and minimizing downtime due to network issues.
5. **Career Advancement:** Participants can enhance their career prospects by acquiring valuable skills in network security and administration, which are in high demand in the IT industry.
6. **Knowledge Sharing:** The workshop will foster knowledge sharing and collaboration among participants, creating a network of professionals and enthusiasts interested in network security and administration.
7. **Networking Opportunities:** Participants will have the opportunity to network with like-minded individuals and potentially build professional connections that can be valuable in their careers.
8. **Community Building:** By organizing the workshop, the project will contribute to building a sense of community among IT professionals and enthusiasts with a shared interest in network security.

COURSE OUTCOMES ADDRESSED -

ITG401-4

Troubleshoot network maintenance and virus problem.

PROPOSED METHODOLOGY

Proposed Methodology for Zenmap Network Security Assessment Workshop:

1. **Needs Assessment:**

    - Identify the target audience, such as network administrators, IT professionals, or students.
    - Conduct a survey or needs assessment to determine the participants' prior knowledge and specific learning objectives.

2. **Registration and Participant Communication:**

    - Create a registration process for participants, including online registration forms if applicable.
    - Communicate logistics, such as workshop date, time, venue, and required materials, to registered participants.

3. **Group Discussions and Q&A:**

    - Facilitate group discussions on network security topics and encourage participants to share their insights and challenges.
    - Allocate time for questions and answers, allowing participants to seek clarification on workshop content.

4. **Networking Opportunities:**

    - Create opportunities for participants to network with each other, fostering professional connections and knowledge exchange.

5. **Evaluation and Feedback:**

    - Collect feedback from participants regarding the workshop's content, delivery, and organization.
    - Use feedback to assess the effectiveness of the workshop and identify areas for improvement.

6. **Follow-Up Resources:**

    - Provide participants with additional resources, such as recommended readings, online tutorials, and links to community forums where they can continue learning about Zenmap and network security.

7. **Documentation and Reporting:**

    - Document the workshop proceedings, including any notable achievements, feedback, and areas for improvement.
    - Generate a report summarizing the workshop's outcomes and any insights gained from participant feedback.

Resources Required -

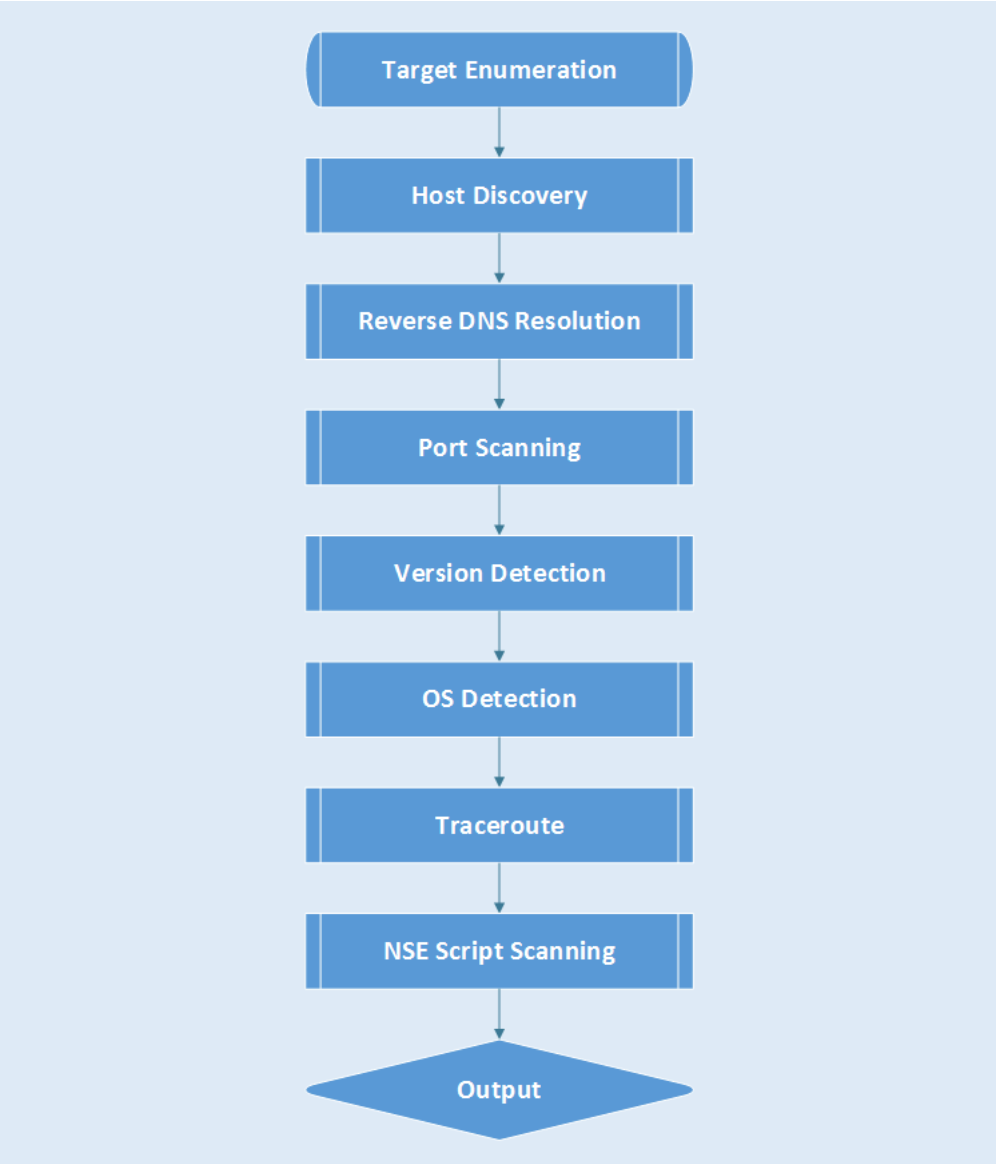
1. Personnel:
   - Project Coordinator: Responsible for project planning, organization, and coordination.
   - Instructors or Trainers: Experienced individuals who can deliver workshop sessions effectively.
   - Technical Support: Personnel to assist participants with technical issues during the workshop.
   - Administrative Support: For tasks like registration, logistics, and communication.
   - Subject Matter Experts: Individuals with in-depth knowledge of Zenmap and network security.
2. Training Venue:
   - A suitable physical or virtual location to conduct the workshop with adequate seating, power outlets, and internet access.
3. Computers and Equipment:
   - Computers with Zenmap pre-installed for participants to use during the workshop.
   - Projectors or screens for presentations.
   - Audiovisual equipment for delivering lectures and demonstrations.
4. Software and Tools:
   - Zenmap software (latest version) for each participant's computer.
   - Presentation software for creating and delivering instructional materials.
   - Collaboration tools for sharing resources and communication during and after the workshop.
5. Training Materials:
   - Workshop agenda, outlines, and training materials (slides, handouts, exercises).
   - User manuals or guides for Zenmap.
6. Networking Infrastructure:
   - Reliable internet connectivity to facilitate software downloads, updates, and online resources.
7. Promotion and Registration:
   - Marketing and promotional materials to attract participants.
   - Online registration and communication platforms for participant sign-up and information distribution.
8. Projector and Screen:
   - To display presentations and software demonstrations to the audience.
9. Documentation and Reporting Tools:
   - Software for documenting project activities and generating reports.
10. Backup and Contingency Plan:
    - Backup resources and contingency plans to address unexpected issues or challenges

How to use Zenmap Tool

1. **Installation:**
   - Start by downloading and installing Zenmap on your computer. It's available for Windows, macOS, and Linux. You can download it from the Nmap website.
2. **Launch Zenmap:**
   - After installation, launch Zenmap from your computer's application menu or desktop shortcut.
3. **User Interface:**
   - Zenmap will open with a user-friendly interface. The main window allows you to configure and run scans.
4. **Select Target:**
   - In the "Target" field, enter the target IP address or domain name that you want to scan. You can scan a single host or a range of hosts.
5. **Scan Profile:**
   - Choose a scan profile from the list. Zenmap offers several predefined profiles with different scan intensities, such as "Intense Scan," "Quick Scan," and "Ping Scan."
6. **Additional Options (Optional):**
   - You can further customize the scan by clicking on the "Profile" drop-down menu and selecting "Edit Scan Profiles." Here, you can fine-tune the scan settings, including specifying which ports to scan, enabling Nmap Scripting Engine (NSE) scripts, and more.
7. **Run the Scan:**
   - Click the "Scan" button to start the scan. Zenmap will begin scanning the target and display the progress in the main window.
8. **View Results:**
   - Once the scan is complete, Zenmap will display the results in a user-friendly format. You can view information about open ports, services, operating systems, and more.
9. **Save and Export Results:**
   - If desired, you can save the scan results or export them to various formats, such as text, XML, or HTML.
10. **Analysis and Interpretation:**
    - Analyze the scan results to identify potential vulnerabilities, misconfigurations, or security issues. Zenmap provides information about the target's network services and systems.
11. **Advanced Features:**
    - For users with more experience, Zenmap provides advanced features for scripting, custom scans, and additional configuration options. You can access these features via the "Command" and "Script" tabs.
12. **Documentation:**
    - If you need additional guidance or information, you can refer to Zenmap's documentation and user guides, available on the Nmap website.

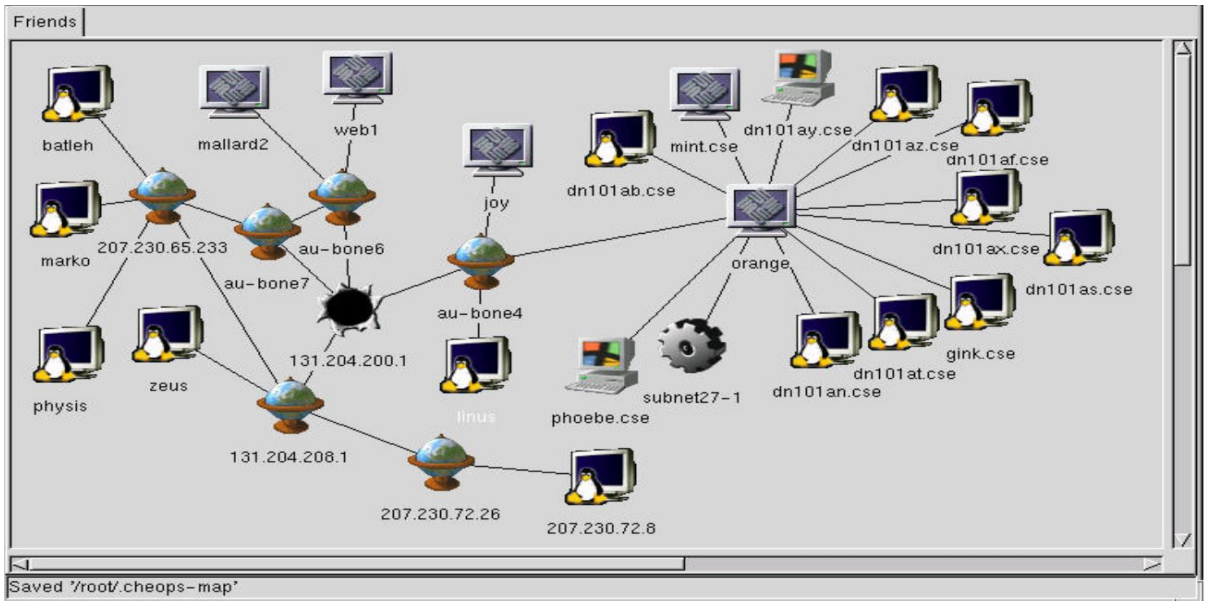
ARCHITECTURE

NMAP run stages flow diagram



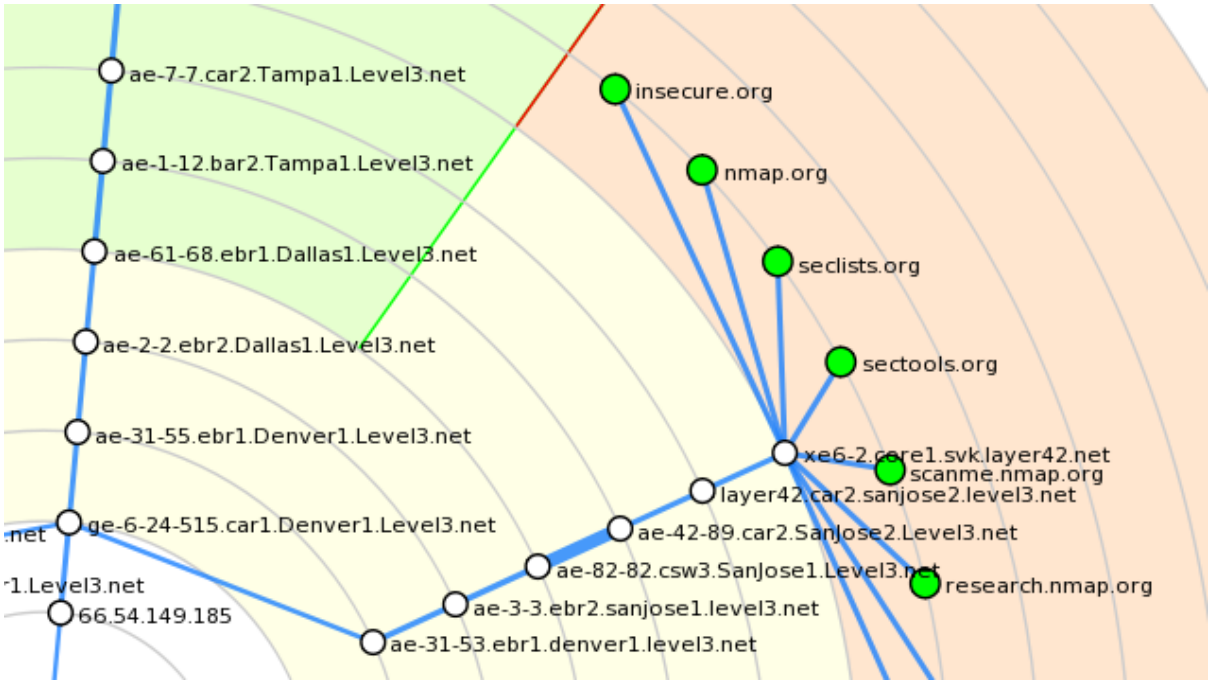
An Overview of the Topology Tab

Zenmap's “Topology” tab provides an interactive, animated visualization of the connections between hosts on a network. Hosts are shown as nodes on a graph that extends radially from the center. Click and drag to pan the display, and use the controls provided to zoom in and out. Click on a host and it becomes the new center. The graph rearranges itself in a smooth animation to reflect the new view of the network. Run a new scan and every new host and network path will be added to the topology automatically.

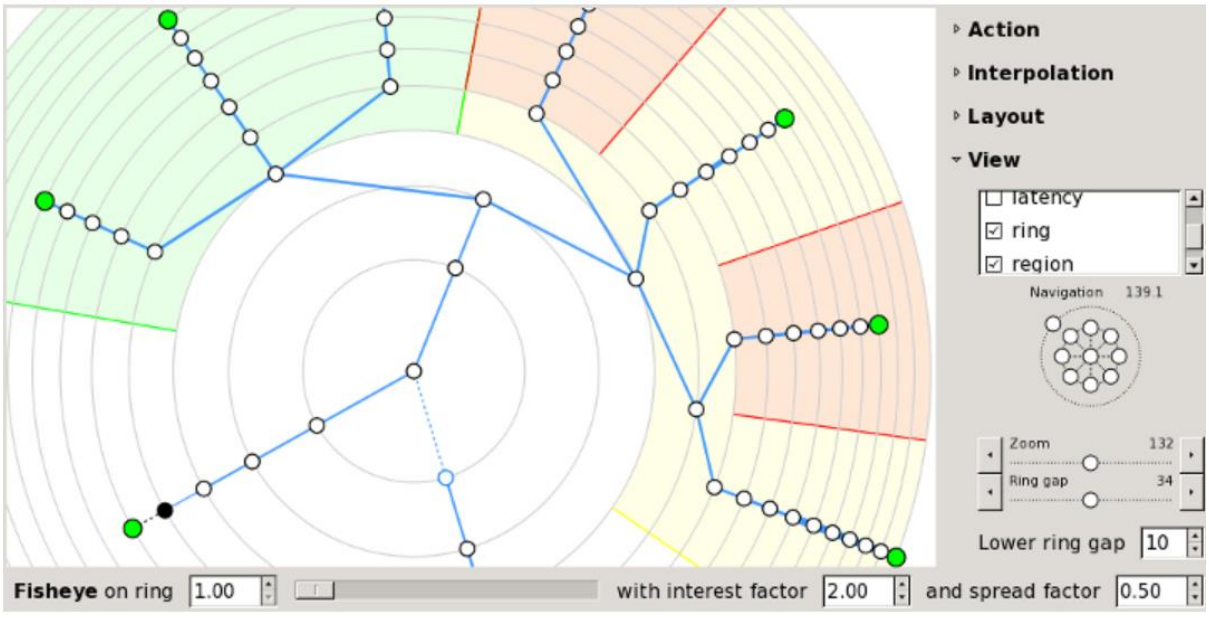


OUTPUT

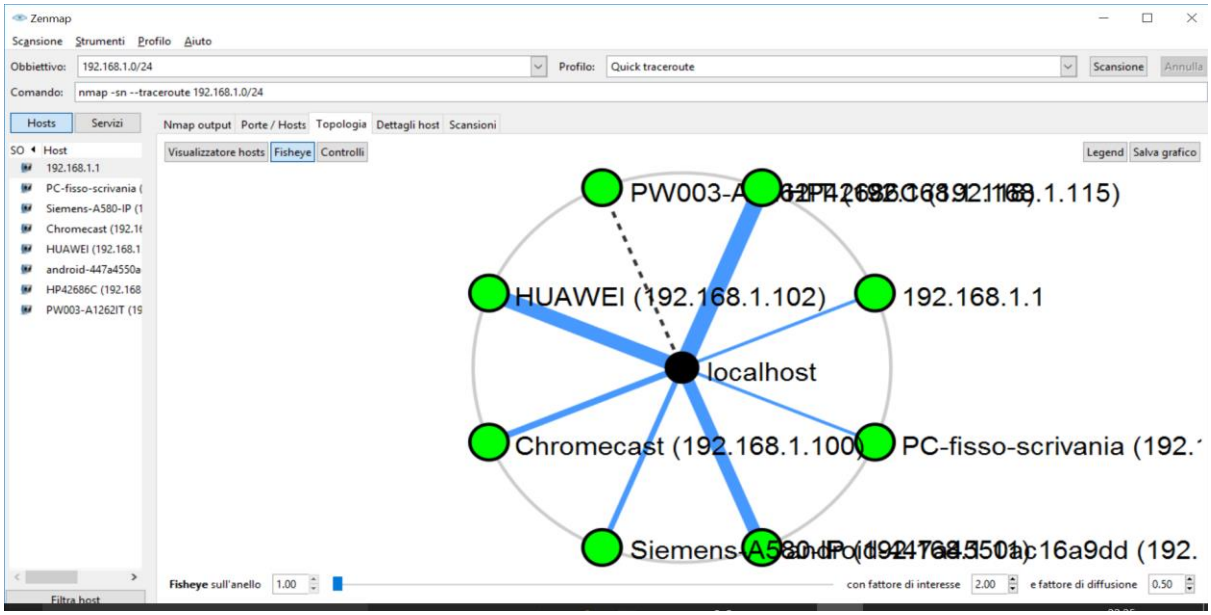
Network Topology



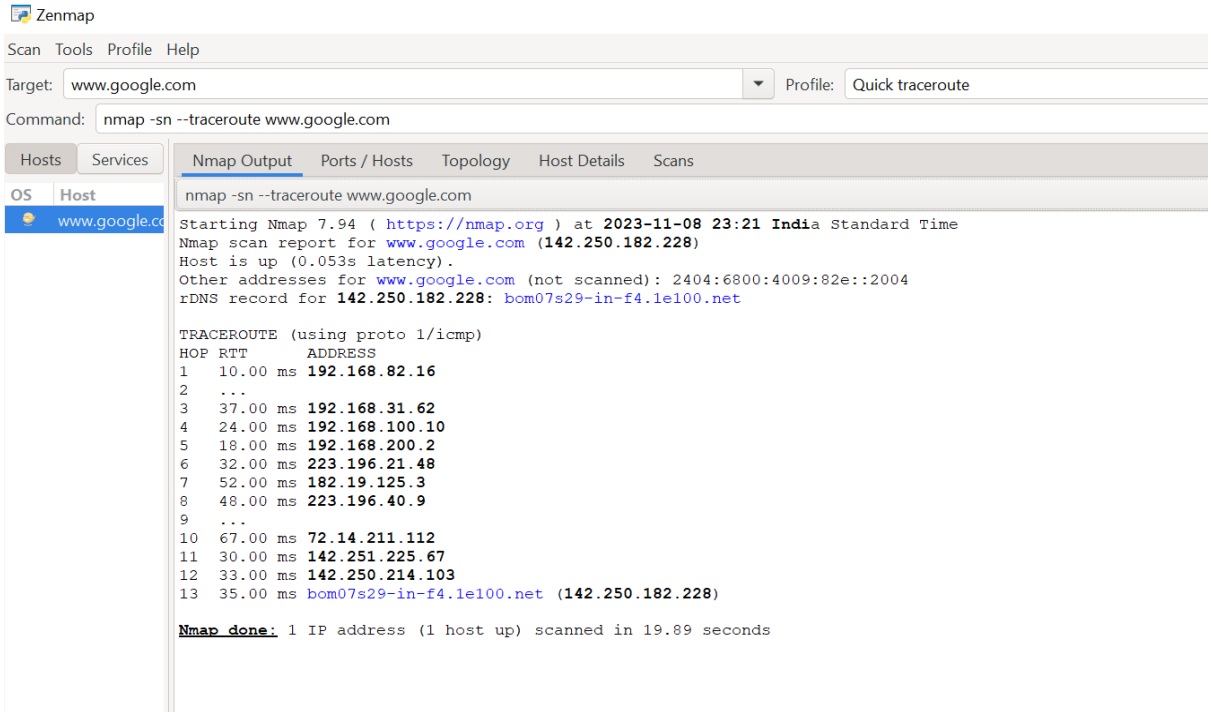
Surfing the Network Topology

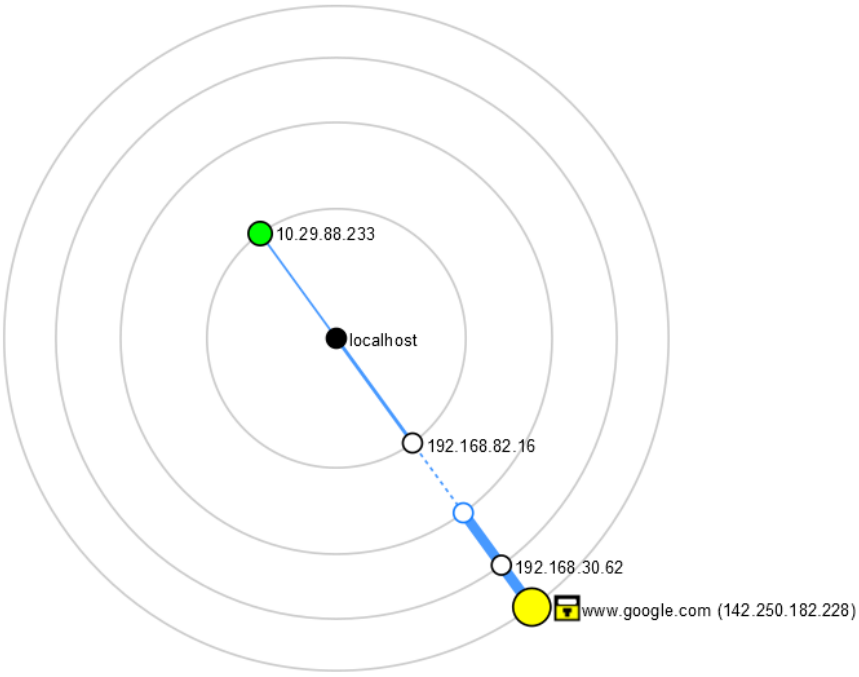


- ZenMap is a graphical interface to facilitate the use of nmap. With zenmap, you can construct nmap queries easily, and run them from a graphical interface. However, its best enrichment to nmap is about the output. ZenMap can actually visualize the topology of the network graphically, and you can click on each host to gather more information.



- Traceroute is a network diagnostic tool that helps you trace the route packets take from your computer to a specified destination. It can be useful for identifying network hops, latency, and potential issues along the way. Here's how you can perform a traceroute to a target using the command-line interface:
- Here's how you can perform a traceroute to "www.google.com" using the command line in Windows




10.29.88.233
localhost
192.168.82.16
192.168.30.62
www.google.com (142.250.182.228)

APPLICATIONS OF THIS MICRO-PROJECT

1. **Network Security Assessment Project:**
   - Create a project focused on assessing and improving the security of a network. Use Zenmap to scan the network, identify vulnerabilities, and propose security enhancements.
2. **Network Inventory and Monitoring System:**
   - Develop a system that uses Zenmap to create a comprehensive inventory of network devices and continuously monitor their availability and status.
3. **Network Topology Mapping Tool:**
   - Create a project to map and visualize network topologies using Zenmap, allowing administrators to gain a better understanding of their network infrastructure.
4. **Cybersecurity Assessment Tool:**
   - Develop a cybersecurity assessment tool that uses Zenmap to identify vulnerabilities, misconfigurations, and potential security threats within a network.
5. **Network Administration and Troubleshooting Tool:**
   - Create an application that integrates Zenmap for network administrators to troubleshoot network issues and optimize network performance.
6. **User-Friendly Network Scanning Tool:**
   - Create a user-friendly network scanning tool that simplifies the use of Zenmap for individuals who are not familiar with the command-line interface.
7. **Network Documentation and Reporting System:**
   - Build a system that leverages Zenmap for documenting network configurations and generating reports on network status and security.
8. **Zenmap User Guide and Documentation:**
   - Contribute to the Zenmap community by creating user guides, documentation, and educational materials to help users effectively utilize the tool.
9. **Network Visualization and Reporting Tool:**
   - Create a tool that uses Zenmap to visualize network data, generate network status reports, and provide insights into network health and security.

CONCLUSION

In conclusion, Zenmap is a valuable graphical user interface (GUI) for Nmap, a powerful and widely-used open-source network scanning and security assessment tool. Zenmap simplifies the process of network discovery, vulnerability scanning, and network mapping by providing a user-friendly interface for both beginners and experienced network administrators and security professionals.

This tool has diverse applications, ranging from network security assessments to network monitoring, vulnerability identification, and educational workshops. It can be incorporated into projects that aim to enhance network security, understand network topologies, and improve network administration. Whether you're conducting a network security assessment, organizing a training workshop, or developing tools for network monitoring, Zenmap can be a valuable asset.

The flexibility and versatility of Zenmap make it a useful tool in the toolkit of network administrators, security professionals, and enthusiasts alike.

REFERENCES

1. **Official Nmap Website:**

- Website: Nmap Official Website
- The official website is a comprehensive resource for Nmap and its associated tools, including Zenmap. It provides documentation, downloads, user guides, and a wealth of information about network scanning and security assessment.

2. **Nmap Reference Guide:**

- The Nmap Reference Guide, available on the official website, offers in-depth information about Nmap, Zenmap, and their features. It covers scan techniques, NSE scripts, and usage examples.

3. **Zenmap User Guide:**

- The Zenmap User Guide, found on the Nmap website, provides detailed instructions on how to use Zenmap. It covers installation, basic usage, advanced features, and practical examples.

4. **Online Tutorials and Forums:**

- Various online resources and forums, such as Stack Overflow and specialized security forums, feature discussions and tutorials on using Zenmap and Nmap.

5. **GitHub Repository:**

- The source code for both Nmap and Zenmap is available on GitHub. You can explore the repositories for the latest updates and issues.
- GitHub: Nmap on GitHub

6. **Documentation on the Command Line:**

- In a command prompt or terminal, you can access Nmap's built-in documentation by typing nmap --help or zenmap --help. This provides an overview of command-line options.

ASSESSMENT SCHEME

SR.NO.	Assessment Paramenters	Out of Marks	Obtained Marks
1	Technical preparedness for practical	5	
2	Operating skills/Algorithm/ flowchart	5	
3	Observation/Logic/ Program	5	
4	Results/Output	5	
5	Safety/Discipline and Punctuality	5	
6	Total	25	Signature with date