Technical Architecture

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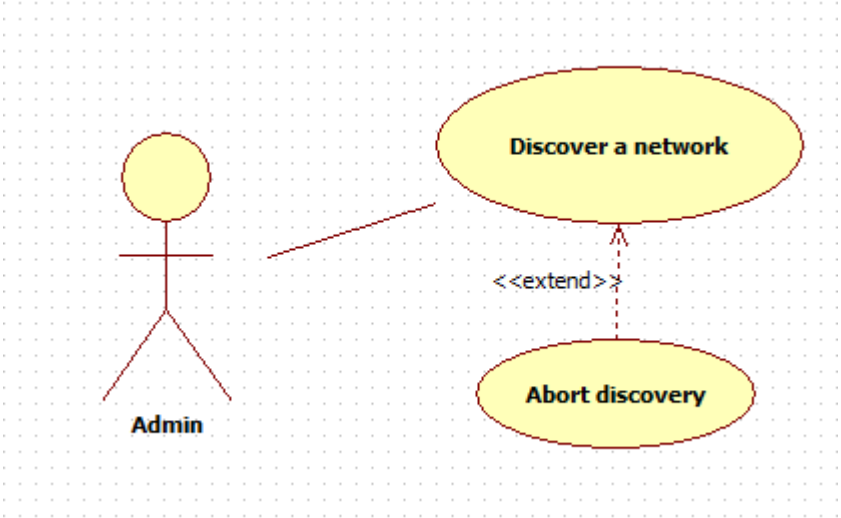
1. Use Cases

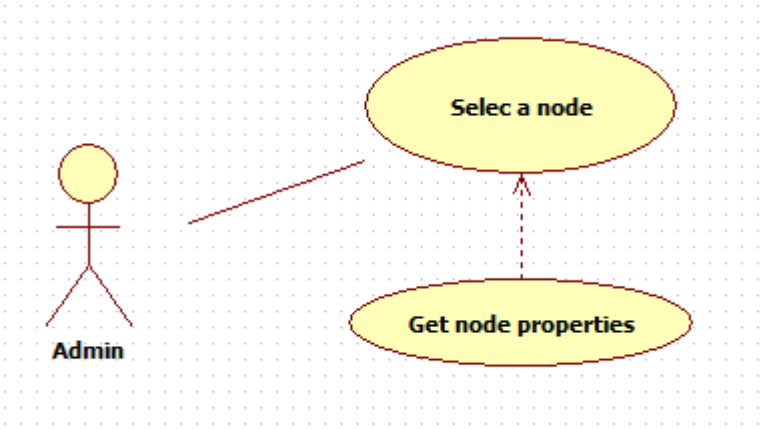
USE CASE 1

Title: Discover a network
Actor: Administrator/Network Manager
Scope: Administrators Machine
Level: Discover a network
Brief Description: An administrator performs a scan of local network to discover all connected devices.
Story: An administrator starts the program and selects the "Scan" button which starts the network discovery protocol. As network is being scanned user will see nodes appearing on the screen connected to each other. At any point in time user may abort scanning procedure.



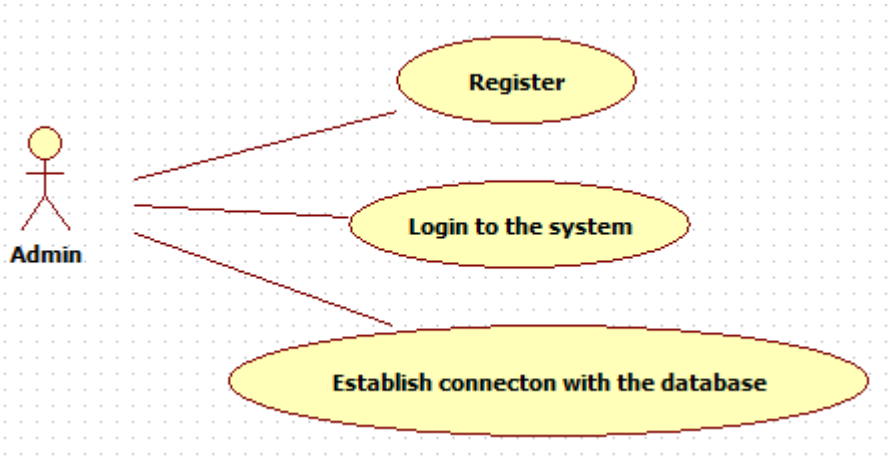
USE CASE 2

Title: Get information about specific node
Actor: Administrator
Scope: Administrators Machine
Level: Node details
Brief Description: An administrator selects a node from the map and displays its properties.
Story: After successful scan an administrator selects a node of interest and displays its properties if available. User may also use search function to quickly navigate to the node. In this case search may be done by IP addresses or host name.



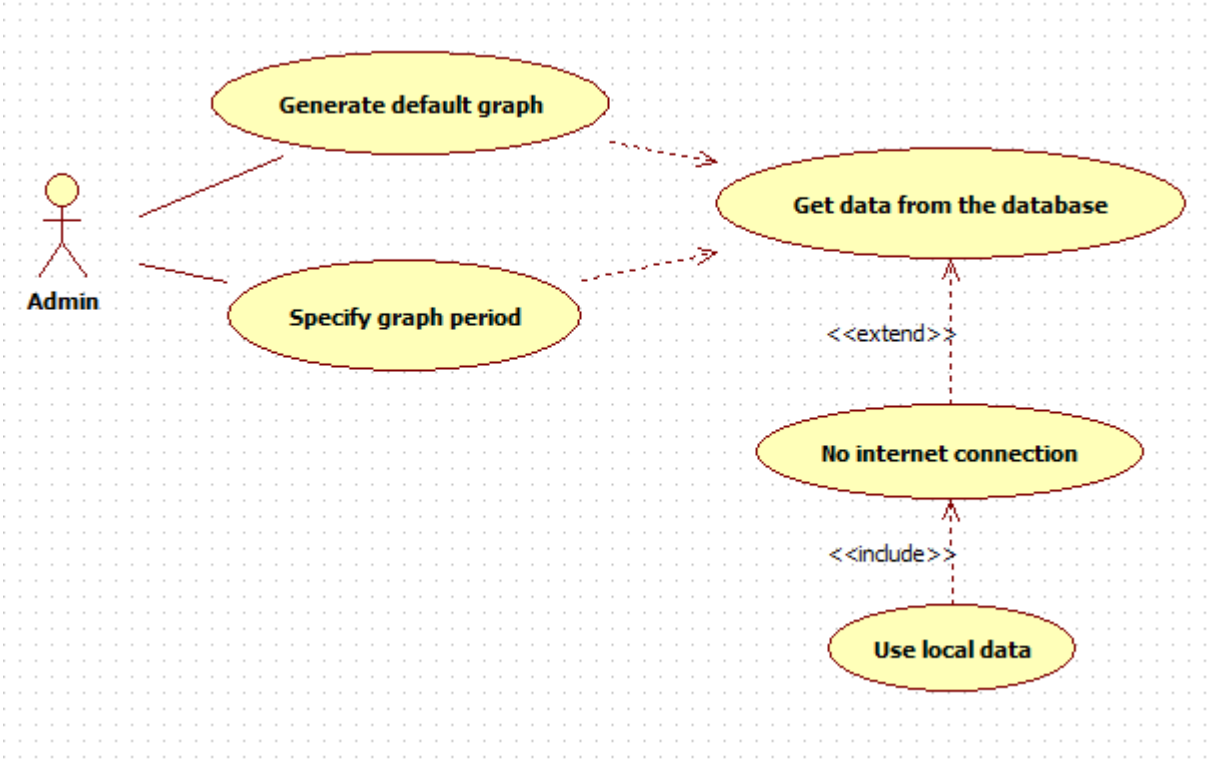
USE CASE 3

Title: Login to database
Actor: Administrator
Scope: Administrators Machine, internet
Level: Database connection
Brief Description: An administrator registers and establishes the connection with remote database.
Story: User selects Register option and fills in the details. If valid notification is being shown to confirm successful account creation. Once the account will be created user may log in and connect to the database. The same username and password will be required for login in to the android version of the software.



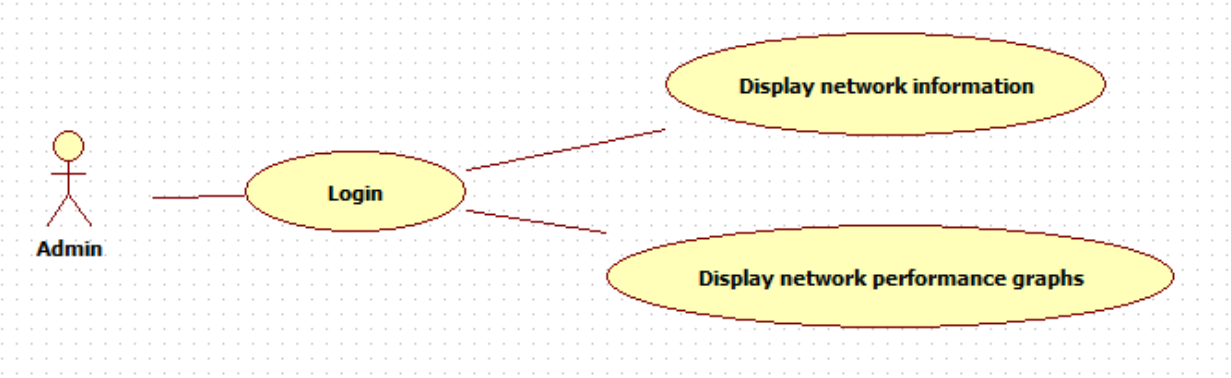
USE CASE 4

Title: Graph network performance
Actor: Administrator
Scope: Administrators Machine, internet
Level: Database access
Brief Description: An administrator selects an option to graphically display overall performance of the network from previous days.
Story: User chooses an option to display a graph of performance of the network. User may also specify the period that he is interested (if not by default program will fetch the data from recent days stored in the database). Once specified a graph will be built from the data gathered from previous days. If the connection to the database is not available use alternative data stored locally if user agrees.



USE CASE 5

Title: Get information on mobile device
Actor: Administrator
Scope: Android phone
Level: Mobile access
Brief Description: A mobile user logs in to mobile app and displays network information on his device.
Story: User logs in to his device and pulls down the information from the database. If user is not connected to the internet system will issue a message. User will also be able to login to his app in offline mode, but in this case, only information available on his device will be accessed.



2. Technical Architecture

2.1 Software Components

Front End

Project will be mainly developed in Visual Studio with additional programs which functionality will greatly improve the development process. A WMIC application allows for accessing system components and retrieving detail information about each, e.g. Win32_NetworkAdapter class is made of sub classes like e.g. Address class which allows for retrieving an IP address for that machine. Another software component used for windows application is PowerShell. This software provides scripting capabilities for retrieving detail information about current system and its network neighbours.

For the development of mobile app Android Studio will be used since it's a native tool for development of android applications.

Back End

Storing information about current network will requires connection to the database, for that purpose Microsoft Azure will be used to store the information on the cloud. To increase the performance of the system also XML files will be created locally to quickly access necessary information.

2.2 Platform Libraries

Platform

- Windows PC
- Android

Windows PC Libraries	Android Libraries
• **Network List Manager**	• **Microsoft Azure**
• **PowerShell (Management Automation)**	• **Graph View**
• **Microsoft Azure**	
• **SNMP**	

2.3 Distribution and Deployment

Software is mainly aiming to be deployed for windows platform but also simpler version of the software will be available on android phone. Once the program will run on administrator computer it will generate a map of local area network which will be saved on the machine after successful scan. Local files will be saved in XML format to allow the user to quickly access the map and all the details about the network without a need to pull down the information from the database or performing new scan. The purpose of the database is to store the information generated by the network for future analysis. When the user decides to view the overall performance of the network system will generate graphs from the data gathered earlier on. Also that data will be available for android version of this software. This will allow the user to view the map on mobile device without need to perform the scan. Also ability to display the graph will be provided.

In order to use the program efficiently user will have to register to obtain a connection to the database. Each user will be asked to create an account with will allow them to use the online database. Android version of this program will also require user authentication to pull down the information from the database. Mobile version of this project will be available on Google Play Store to download. The PC version will be linked to the android app so when the user can simply follow the link in the description to download the software.

2.4 Risks

This project focuses a lot on networking aspect and it may require some extra privileges from the administrator of the computer or network for program to work correctly. If network to which the system is connected is heavily restricted user may not see all the devices on the local network. Also if user will not be connected to the internet he won't be able to retrieve the data that sits on the database which is important for creating detail diagrams of network performance.

An android version of this software may require some extra processing power in order to draw graphs and display the network map.

3. Prototype

3.1 Prototype Deliverable for week 8

Use cases 1-4 should be functional and provide main information about the network. Use case 5 may be functional but it will not have the full functionality just yet. Desktop version will be able to gather information and process them to draw graph of network performance, however some options will be not available.

Testing phase will require access to different type of networks, Private and Public in order to test the abilities and functionality of the system. Private network such as small home network will allow for quick discovery of any devices in the network and it will reveal any issues with the software.

In order to test the capabilities of the program and its correctness regarding building of the network map program will also be tested in closed environment. A simple network build of routers and switches and some end devices will be used to test program capability of discovering network devices. Simple to follow topology should be easier to follow in the testing phase and it will also quickly show any issues with visualising the network.

In order to make sure that the GUI is not confusing and too complicated software will be available to few testers who will provide essential feedback on the software and any possible bugs or other issues that were not discovered before.

Unit tests will be written to try to break the code and also reveal issues with the system.

3.1 Prototype Deliverable for week 11

All use cases will be functional and will provide full functionality to the users. Based on feedback from testers on first prototype adjustments will be made to improve the system and overall quality. Possible bugs with the first version will be fixed and tested.

Both version of the software will be tested in different networking environments to make sure that they can download process and handle the data. Again the software will be handled to testers to get more feedback and information about possible undiscovered issues.