

METU, Department Of Computer Engineering
Graduation Project

Proposal For
Project Information

Title

Personal network over the internet

Target

Public []

Restricted [✓]

Proposer Information

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IP (Intellectual Property) Information

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Project Description and Background Information

Description

Today, people are using more devices than a single computer or cellphone, they have all devices that modern technology supply for different purposes like personal and business laptops, tablets and even multiple smart phones. Since people have started to use these much different appliances, a remote control mechanism become a necessity for management of all the advanced technology. Realizing that, while companies like Google and Yandex provide account synchronization on different devices, cloud services like Dropbox and Amazon Cloud partially solve the problem of accessing files on distributed file systems. However, none of those services procure a full access to multiple devices in both file and operating system manners. This project promises a personal network that allows users to control all their submitted devices like a single device and full or partial -depending on operating system- access over them. Apart from one-to-one tunnel communication between two appliances, a many-to-many connection on the network make multi-directive intercommunication possible. Moreover, excluding third party cloud services like Dropbox, a more secure file transmission become trend using personal network. In this project, file transmission will be depended on the concept distributed file system¹ principle. Besides, remote control feature involves controlling commercial console applications on operating systems -like media players, download managers etc.-.

To be more precise, the project consists three main developmental aspects; which are,

- Connecting personal devices in different platforms over the internet using personal account system.
- Implementing/using file transfer protocols between connected devices.
- Manipulating/controlling OS applications -for example collecting logs, starting/running programs- via the network.

Similar Products/Projects

Teamviewer have similar service with a 1-to-1 communication principle.

There is a master thesis on topic personal networks written by M.E Jacobsson.²

MAGNET is a comprehensive research on this topic.

Justification of the proposal

Personal networks is a concept related to pervasive computing with a strong user-focused view. Personalization and distributed access to information and communication will be main focus of the project.

While some existing technologies can offer solutions to some parts of device integration, there is still very little work on combining these technologies into a seamless integrated solution for a normal user. Today, employers have experts that sets up servers and configures wireless devices to inter-operate with their enterprise software on behalf of their employees. Even so, these solutions are

¹ https://en.wikipedia.org/wiki/Clustered_file_system#Distributed_file_systems

² <http://repository.tudelft.nl/view/ir/uuid:af33cd79-4600-4cfc-93b7-19ee66840c70/>

typically application-specific and will not work for new applications without proper integration. For the end-user, they are far from seamless. Complex settings cause frustrations and make people wonder whether it will work at the next customer visit. Our project tries to address this issue by aiming at being easy to use, setup, configure, and maintain, as well as fast and secure.

Contributions, Innovation and Originality Aspects of the Project

While a few commercial services provide similar networking system, this project offers a complex personal network topology that allows all devices communicate with each other securely with minimum configuration and user intervention. The originality of the project is simply its working principle, instead of using 1-to-1 connections between two devices, by this project, communication between appliances on the network can be established and controlled from any other network-member device. In this manner, other similar applications provide a tunnel-like communication between only two devices and also support only basic file transfer. In contrast, the personal network contributes to a wider control and management mechanism on and between all member devices with both file transfer and application-running features.

Technical Aspects of the Project

In the project's scope, using the application running on one network-member device, each device's file system would be accessible and desired file operations between devices like download, upload, move etc. could be done via HTTP/FTP server implemented by the group members. For this purpose, file browsing interfaces will be implemented using Java for Android development and appropriate API's compatible with related OS's like Windows form application system for Windows devices. Similarly, OS-specific online controllable programs -such as Torrent clients- would be manipulated or system logs related to this programs would be collected using the personal network application.

In short, the project contains following workload:

- * Developing Windows/Linux and Android applications(Preferably a web application interface)
- * Analyzing and customizing network protocols and topologies between computers and mobile devices
- * Analyzing and customizing file transfer protocols between computers and mobile devices
- * Analyzing and customizing security protocols between computers and mobile devices
- * OS manipulation to access console applications remotely
- * Creating account management system over network
- * Working with different programming languages and concepts for adaptability to crossplatforms
- * Designing and implementing a server-client application

Targeted Output, Targeted User/Domain Profile

As a business model, the end-product appeals to all corporations' IT departments to access multicomputers in the company.

For end-users, the product will be easier to use in compare other similar applications on the market since they are mostly technical service support directed.

Project Development Environment

IDEs of programming languages like Eclipse and Visual Studio, software development kits and their simulators like Android Studio will be used. Preferably, different programming languages for crossplatform applications -Java, C#- and also for socket/server programming would be used.

External Support

There is no planned external support except build-in language libraries and standart network-related protocols.