A

Seminar report

On

Home Networking

Submitted in partial fulfillment of the requirement for the award of degree
Of MCA

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Preface

I have made this report file on the topic **Home Networking;** I have tried my best to elucidate all the relevant detail to the topic to be included in the report. While in the beginning I have tried to give a general view about this topic.

My efforts and wholehearted co-corporation of each and everyone has ended on a successful note. I express my sincere gratitude to …………..who assisting me throughout the preparation of this topic. I thank him for providing me the reinforcement, confidence and most importantly the track for the topic whenever I needed it.

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Introduction

Home Networking is the collection of elements that process, manage, transport, and store information, enabling the connection and integration of multiple computing, control, monitoring, and communication devices in the home. The price of home computers keep falling, while the advantages for consumers from being connected online investing and shopping, keeping in touch with long distance friends and tapping the vast resource of the Internet CE keep multiplying. No wonder an increasing number of households own two or more PCs.Until recently, the home network has been largely ignored. However, the rapid proliferation of personal computers (PCs) and the Internet in homes, advancements in telecommunications technology, and progress in the development of smart devices have increasingly emphasized the need for an in home networking. Furthermore, as these growth and advancement trends continue, the need for simple, flexible, and reliable home networks will greatly increase.

What is Home Networking?

A home network is a group of devices – such as computers, game systems, printers, and mobile devices – that connect to the Internet and each other. Home networks connect in two ways: A wired network, which connects devices like printers and scanners with cables

Why Set Up a Home Network?

There are many reasons to establish a home network. Here are just a few of the things home networking allows you to do:

- Connect to the Internet from multiple computers, game systems, mobile devices, and more.
- Access files and folders on all devices connected to the network.
- Print from multiple computers on a single printer.
- Manage security settings for all networked devices in one place.

If you're ready to try home networking, read below to find out what you'll need to get started and to see the options available for your network.

What You Need to Set Up a Home Network

To set up home networking, you'll need the following:

- XFINITY Internet Service subscription (or subscription to another Internet provider)
- A **modem**, which connects to the Internet, and a **router**, which connects your devices to each other and to the Internet through your modem (or a **gateway**, which functions as both a modem and a router)
- A computer or other device to connect to the network

The Wireless Gateway 1 (model numbers TG852G, TG862G, SMCD3GNV, TC8305C) and Wireless Gateway 2 (model number DPC3939) function as an all-in-one modem, router, and phone device. They automatically provide users with the best security settings available for a home network. Find out more about wireless gateways.

Wireless Home Network

A wireless network, often called Wi-Fi, connects devices to each other and to the Internet without using cables. Read our rundown of wireless networking and its benefits.

Wired Home Network

A wired home network connects devices to each other and to the Internet using Ethernet cables.
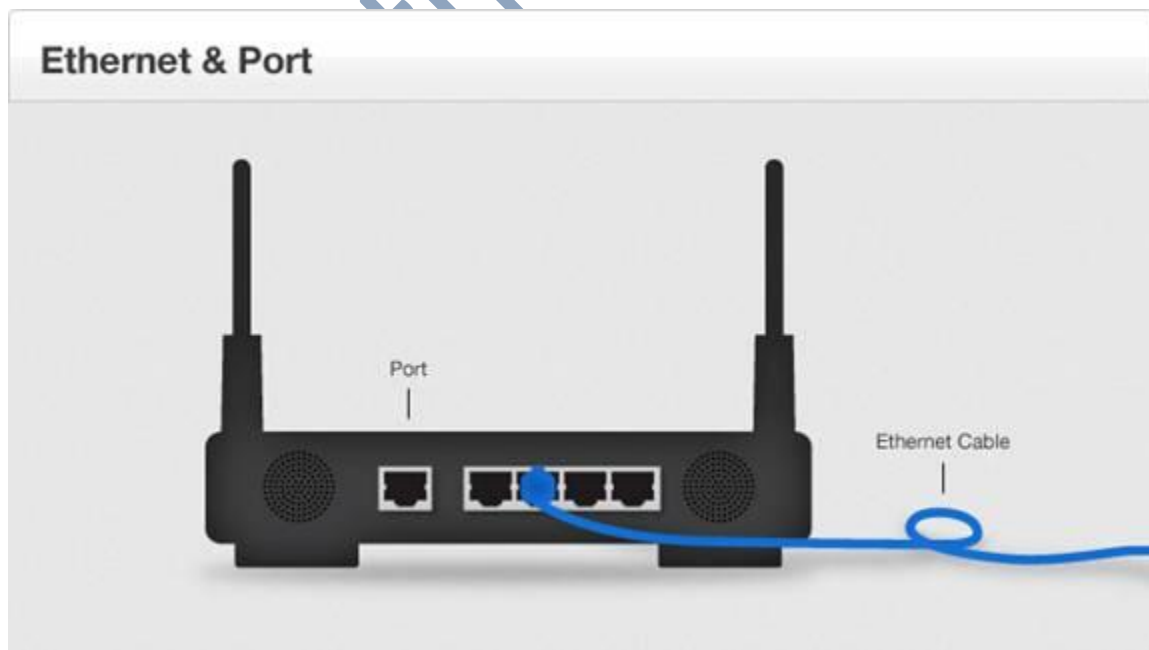
There are several benefits to having a wired home network:

- Faster and more reliable connection to the Internet
- Increased security, as no outside users can access your network
- Easier set-up and troubleshooting than wireless connections

Mixed Home Network

Many people find that a mix of wireless and wired networking meets their needs best. For instance, devices that stream movies benefit from the quicker and more stable wired connection. Devices like laptops or tablets, however, benefit from the mobility available with a wireless connection.

Both the Wireless Gateway 1 and Wireless Gateway 2 come with wireless capability and four Ethernet ports, allowing you to connect devices with and without cables at the same time.

Home Networking Glossary

Below is a list of common home networking terms. Take a moment to familiarize yourself with these definitions, as they'll likely be mentioned in other help articles.

Wireless network – A group of devices (computers, game systems, e-readers, etc.) connected to each other and to the Internet without cables, also called **Wi-Fi**.

Modem – A device that connects routers or computers to the Internet through a cable.

Router – A device that transmits a wireless signal and connects devices to each other and the Internet through the modem.

Gateway – A device that functions as both a modem and a router, like the Wireless Gateway 1 or Wireless Gateway 2.

Signal range – The area in which a wireless-capable device can pick up the wireless signal and connect to the wireless network.

Administration site – The online site used to view and change the settings of a router and wireless network, called the Admin Tool for the Wireless Gateway 1 and Wireless Gateway 2.

Router username and password – The login information used to access the administration site.

Network Name (SSID) – The name of a wireless network.

Network Password (Key) – The password used to connect to a wireless network.

Advantages

- The main advantage of a network is that multiple users can simultaneously interact with each other and share resources for example the internet connection
- After the home network is created, as many wireless devices like laptops and mobile phones can connect to it *if it's a wireless router that is* and more PC's can also be connected with ease
- It is easy to create if known how to - we will be explaining at a later stage just how simple it is showing a step to step guide.
- You can also add devices to the network like a printer. This will allow anyone with access rights to be able to print a file on any of the computers connected to the network

Disadvantages

- Buying all the equipment required *dependant on how many computers will be on the network* can be expensive
- Complete set up of a network can be difficult and challenging for people who are computer illiterate
- Depending on the network topology type, a broken cable can halt the whole network.
- If the admin of the network doesn't know about securing the wireless on the router, anyone within range could be stealing the Internet connection and in result potentionally have access to personal data.

The Future of Home Networking

What's New?

Home networks are starting to be bombarded by a plethora of new use cases:

- **Ever increasing devices in the subscriber home:** Tablets, smartphones, laptops, smart-TVs, game consoles, smart appliances, the list goes on and on.
- **Separation of guest users from home users:** As more and more of our lives become digital, the need to keep guests from accessing your personal data (photos, tax returns, etc.) is growing. More and more homes require a trusted network for their own use and a guest network to grant visitors Internet access.
- **Community Wi-Fi:** Another new wireless use-case is the addition of a Wi-Fi GW (or additional SSID) in the subscriber home is used to provide Wi-Fi roaming services to folks passing by outside of the home.
- **Femto cell:** A GW in the subscriber home used to provide cellular services over the existing Internet connection.
- **Smart grid:** Home routers providing connectivity to utility company equipment.
- **Security, Monitoring, & Automation:** More and more sensors and other devices are becoming IP enabled and need network connectivity to function.
- **Multi-homing:** Users who are increasingly dependent on Internet access may choose to reduce their odds of failure by having two distinct connections, maybe Cable and DSL, or Cable with an LTE backup, etc.
- **IP video streaming from the Internet:** Video is going IP. Netflix, Youtube, Hulu, HBO-Go, and soon perhaps even your cable channels, IP video is the largest consumer of Internet bandwidth today and shows no sign of slowing.
- **Video content sharing and streaming between the devices inside the home:** Home movies, downloaded content, ripped DVDs, etc. We need ways to play any content from any source any time.
- **Telecommuting and corporate IT requirements:** As more people choose to work from home, more companies are requiring strict security measures for their employees home networks, including completely separate networks for telecommuting.
- **Emergence of Heterogeneous link layer technologies:** ZigBee, Bluetooth, and others are making plays for home device connectivity, and these devices will need to communicate with the rest of the home network to provide the most benefit.

Tomorrow's Home Network

These emerging use cases for the home network, along with the facilitating technologies (including IPv6), seem to be pushing us away from the simple, single router home network of the past to a much more complicated multi-router future.

For one example, I think it will become common to buy a pre-packaged "home security system in a box" that will include a multitude of door and window sensors, motion detectors, glass break sensors, etc. all IP enabled and ready to connect wirelessly (perhaps with 6LoWPAN) to the included router / gateway. This home security router will then be plugged in (likely quite

arbitrarily) to the existing home network, alongside a home theater router, a smart kitchen router (perhaps embedded in an eFridge), etc.

Of course, adding routers to a network increases its complexity. In enterprise and service provider networks, increased complexity can be dealt with by training or hiring network engineers (or bringing in contractors). In the home however, I do not believe that we can assume that network users will increase in complexity themselves (nor will they hire engineers). This is the crux of the home network problem statement; how do we deal with increasing network complexity in home networks without increasing the complexity of operating a home network? We must design a network that is completely self-configuring in (almost) every situation. This raises several problems that must be solved.

Opportunities for Innovation

There are a number of problems, er opportunities, that must be addressed to enable this multi-router, arbitrary-topology, configuration-less home network:

- **Prefix-distribution & Routing:** The first problem that likely needs to be considered when developing a multi-router home-network architecture is how to distribute IP prefixes throughout the home, and how to route packets within and out of the home network once it's established. The current default with IPv4 home routers is NAT-stacking, where each router creates its own private (RFC 1918) LAN addresses and NATs into the upstream network, and bridging, where the home router recognizes a private address on its WAN port and stops routing altogether. Some proposed options (focused on Pv6) are recursive DHCPv6 PD, DHCPv6 relay, and a routing protocol (yes, OSPF in your Grandmothers house). More work is needed.
- **Network Detection:** This problem can be split into two; *edge detection* and *up detection*. Edge detection is important for routers to understand if they are a Customer Edge Router (CER) connected to an ISP, or an Internal Router (IR). This is necessary information for many other decisions like whether to activate a firewall, when to perform NAT, etc. Up detection could facilitate "directionless" home routers, common in other environments, and allow hierarchical logical topologies to be built over looped, meshy or other non-linear physical topologies.
- **Multi-homing and Failover:** Having multiple Internet connections greatly complicates routing, especially if the desire is for active/active load-balancing over multiple ISPs. Without introducing BGP and complex routing and forwarding tables, how can we get functional auto-configuring multi-homing? Do we need to?
- **Service Discovery:** Most current service discovery technologies assume a single broadcast domain (a single home LAN). The introduction of multiple home routers will make it more challenging for networked devices to discover each other, especially when they are several hops away from each other (when there are several routers between them). We need solutions for whole-home service discovery that "just work." This could mean additional multicast support, centralized service discovery services, etc.
- **RF Interference:** As we add multiple SSIDs, technologies that utilize multiple channels, and multiple new wireless protocols, how do we avoid service impacting RF interference?

- **Non-IP Gateways:** There are additional challenges that may arise when connecting Zigbee, Bluetooth, and other non-IP networks into your home IP network.
- **Troubleshooting:** After all this is working, we must be able to keep it working. What is an ISP call center going to do to help customers with networking problems in this more complicated environment? How will hired-geeks be able to quickly analyze and mitigate network issues?
- *And More...*This is just the tip of the iceberg, as we start designing, building, and deploying these networks in earnest, there are likely to be plenty of surprises and more "opportunities for innovation."

Conclusion

the latest advances in the Internet access technologies, the dropping of PC rates, and the proliferation of smart devices in the house, have dramatically increased the number of intelligent devices in the consumer premises. The home networking requirement introduces into the market a new breed of products called Residential Gateways. A Residential Gateway (RG) will provide the necessary connectivity features to enable the consumer to exploit the advantages of a networked Home. The RG will also provide the

framework for Residential Connectivity Based Services to reach the home. The paper further discusses Challenges for Home Networking and Home Networking Technologies.

References

- www.google.com
- www.wikipedia.com
- www.studymafia.org