ITRAINONLINE MMTK

HOW TO SHOP FOR WIRELESS EQUIPMENT HANDOUT

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1. About this document

These materials are part of the ItrainOnline Multimedia Training Kit (MMTK). The MMTK provides an integrated set of multimedia training materials and resources to support community media, community multimedia centres, telecentres, and other initiatives using information and communications technologies (ICTs) to empower communities and support development work.

1.1 Copyright information

1.2 Degree of difficulty

The degree of difficulty of this unit is Basic.

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2. Introduction

The fact that the variety of wireless devices are endless today does not help the consumer in his choice of finding his specific product, rather the opposite. How anyone can tell what access point is suitable for his network when there is at least hundreds to choose among?

This unit considers a set of useful shopping strategies when procuring wireless equipment. It focuses on creating an awareness around important criteria for selecting a certain product. By knowing what criteria to look for, the buyer will be able to tell “marketing talk” from the truth and make a good choice of equipment for his purpose.

3. Three basic criteria

Three basic criteria that can be applied on procurement of any kind of equipment are:

1. What do you want to do?
2. What is your budget?
3. What equipment is available?

By starting to answering to these questions, you will have come a long way in your decision making. While the first criterion could be considered as the most important one, the other two normally get solved along the way so speak.

In order to know “what you want to do”, you need to know the requirements of the wireless implementation that you will procure for. What is expected of it in terms of coverage area and number of users? Are there potential hidden nodes in the network and will it run indoors or outdoors? Those are some questions that needs to be answered.

4. Criteria for selecting a standard

Before selecting a specific product or vendor, you must know which IEEE 802.11 standard the network will operate under. In order to select which standard that is suitable for you, you should consider the following:

Robustness
If you aim for a robust and reliable network you should go for a mature standard like IEEE 802.11b or IEEE 802.11g that has been on the market for some years. Avoid cutting edge technology and products that has just entered the market.
The robustness of the data transfer is also affected by the modulation technique in use. There are modulation techniques with more redundancy than others, which results in lower bit rates but lower bit error rate and are hence, more robust than others. As a rule of the thumb, run slow if you want to be safe!.

Price
Also here, a mature standard (IEEE 802.11b/g) that has reached the mass market will give you a lower price that products based on the latest standard.

Indoor vs outdoor
An outdoor wireless network often imply hidden node problems as all nodes might not be able to see each other directly. Indoor networks seldom experience hidden node problems since the cells are normally smaller and bound to a certain room. In the case of potential hidden nodes, polling functionality in the base stations is needed in order to avoid collisions.

Additionally, all radio waves are absorbed by the medium that they are passing through. The degree of absorption depends on their frequency. The 5GHz band is specifically sensitive to water (like humans) but also to surrounding buildings and other objects. This can have a great

impact on outdoor networks as the environment can be very dynamic and change dramatically over a short time.

Short vs long links
We know by now that the reach of a electromagnetic wave is longer the lower frequency it has. Hence, the 2.4GHz frequency band should be considered more appropriate for long distance link rather than the 5 Ghz band.

Legal considerations
Last but not least, you must be aware of the legal considerations for the frequency spectrum in the county where you want to do the deployment. A certain frequency spectrum can be unlicensed, require a licence or be forbidden to use at all.

5. Criteria for selecting a product

After making the decision about what standard to use, it is time to consider what product to buy. Here are some basic rules that you should keep in mind:

Robustness
If you look for a product that “won't cause you trouble”, select a mature product from a well known vendor. Even if a problem occur, a firmware update will quickly be made available for you.

Price
Prices varies from vendor to vendor. Sometimes you will pay more for buying the same product from a “well known vendor” that from a vendor that is new on the market.
A higher price can imply that you get a better product, but it can also mean that you get a product with in “shiny cover” that offers the same functionality or additional functionality that is useless for your implementation.
A good advice is to check online sites where consumers grade products that they are using.

Availability
Make sure that the product is available in the time that you need it. Check delivery time and if it is available in a physical place close to you.

Power consumption
Consider if you can you provide enough and stable power to the site of deployment. If power is unstable you should look into products with robust power supplies and surge protections.

Support for your system
Consider that there is local support for your system so that you do not need to import hardware if something fails.

Bandwidth
What bandwidth do you need for your implementation? Take a look at the modulation technique that is being used in the product.

Reach/Coverage
What coverage do you need? Check the frequency of operation of the product.

Output power
What are the legal considerations in the country of the deployment? Is the output power high enough to create a functional link?

Receiver sensitivity
Is the receiver sensitivity good enough to create a functional link?

Antenna (internal/external, gain)

Is the antenna gain high enough to create a functional link?
Is the antenna gain low enough to create a legal link (EIRP)?

6. Conclusions

Making smart decisions regarding procurement of wireless hardware requires some experience (that comes from making previous mistakes) in the field. Consider the following basic rules in your decisions.

1. Always focus on what you need and not what a product can offer you
2. Have a clear picture of the technical requirements of the equipment that you want to procure
3. Select the standard before you start looking at vendor specific products
4. Look for technical specifications (frequency, modulation, polling, encryption, gain, output power, receive sensitivity) rather than marketing talk (10 times faster, 20 km links etc.). (Ask for the specification sheet rather than the marketing brochure)
5. Check online sites for consumer reviews and gradings of products.