Wi-Fi infrastructure and wireless network monitoring programs

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ABSTRACT

In this article analyzes programs that allow you to detect, track and control the flow of passengers at the station through a Wi-Fi device. We also studied wireless IP cameras connected to a Wi-Fi device, their types and additional features.

Introduction. In the modern transport sector, especially in passenger transportation, there are many problems. One of them is the problem of mathematical calculation and the introduction of information and communication technology (ICT) to the calculation of passenger traffic and passenger traffic at terminal stations.

Formulation of the problem. The regularity of the movement of buses and minibuses is one of the main qualitative indicators of the organization of transportation and the level of passenger service. At the initial, final and intermediate stopping points of urban and suburban bus routes, with an interval of movement should be less than 20 minutes, if with an interval of more than 20 minutes. hang out indicators of intervals, hourly schedules for the movement of buses at a given stopping point.

When organizing passenger transportation using mathematical methods and ICT, the following is performed:
- processing and analysis of materials from the survey of passenger traffic;
- development of optimal route schemes and route schedules;
- normalization of traffic speeds on routes;
- automated dispatch control of the movement of buses and passenger taxis;
- forecasting the development of passenger transport.

In these cases, in terms of calculation and accounting, it is necessary to conduct experiments on the spot during the experiment.

The solution to this problem is based on the connection time of smartphones connected to the Wi-Fi device installed at the bus stop and the solution by monitoring through Wi-Fi cameras.

Wi-Fi allows you to deploy a network without running a cable, which can reduce the cost of deploying and/or expanding a network. Locations where cable cannot be installed, such as outdoors and in historic buildings, can be served by wireless networks.

• Allows mobile devices to access the network.

• Wi-Fi devices are widespread in the market. Hardware compatibility is guaranteed through mandatory Wi-Fi logo hardware certification.

• Mobility. You are no longer tied to one place and can use the Internet in a comfortable environment for you.

• Within a Wi-Fi zone, several users can access the Internet from different devices.

• Radiation from Wi-Fi devices at the time of data transfer is an order of magnitude (10 times) less than that of a cell phone.

Wi-Fi networks can be built according to different principles, depending on the tasks that this or that wireless network solves. There are three main principles, according to which most Wi-Fi networks of all sizes are built.

An Access Point, or AP for short, is the most common type of connection.

A Point to Multipoint (P2MP) connection uses a single powerful transmitter that broadcasts a Wi-Fi signal to multiple users. Typically, this connection scheme is used by providers to provide Internet access services. A point-to-multipoint connection has the following structure:

• modem with Internet access;

• access point with a powerful omnidirectional antenna for broadcasting a Wi-Fi signal;

• client receiving devices that transmit a signal to the user's wireless access point.

The MESH network is a conceptually new approach to Wi-Fi. In fact, this is a multipoint-multipoint connection scheme. MESH does not require wires, access points are connected to each other by radio. Thus, you can quickly and inexpensively "cover" a Wi-Fi network of large spaces.

Up to 260 devices can be connected to an average wireless router. Despite the fact that he introduced such a wide range of devices. This issue also requires software to use Wi-Fi devices. Below are some analyzer programs (1-table).

1-table.

№	Program name	Program Information
1	WiFi Analytics	The dashboard displays real-time WiFi information to optimize performance and troubleshoot wireless networks. It allows you to scan 802.11 Wi-Fi coverage, conduct advanced site surveys, and visualize all results in a single dashboard. The software can also create WiFi maps so you can identify where signal leaks or dead zones are.
2	PRTG (Paessler Router Traffic Grapher)	This is an agentless network monitoring software from Paessler AG. It can monitor and categorize system conditions such as bandwidth usage or uptime, and collect statistics from various hosts such as switches, routers, servers, and other devices and applications.
3	NetFlow SolarWinds	NetFlow® SolarWinds® Traffic Analyzer (NTA) is a powerful and affordable NetFlow management solution with comprehensive monitoring tools designed to turn fine details into easy-to-understand graphs and reports to help you more clearly identify which resources are consuming your bandwidth the most. Released as a feature of Cisco routers, NetFlow allows you to monitor IP network traffic information as data packets enter or exit an interface. NetFlow monitoring solutions consist of three main tools: an exporter, a collector, and an analysis application.

4	NetFlow Analyzer	Best NetFlow Analysis Software Used to gather information about your network IP traffic and to monitor network traffic activity, NetFlow generates application flow information. By implementing a high-quality network performance monitor with NetFlow Reporting, you can troubleshoot your network with precision. In large companies with large IT departments, information gained from NetFlow analysis can be used to better plan capacity and make decisions about how best to allocate network resources.
5	Acces Point Selector	However, given that overall network performance will be better, and if the user is using portable equipment (such as a laptop), this method is possible. The results show that using network delay results in a better choice. … Fingerprints are one of the location estimation methods used indoors. It maps information about wireless signals (eg RSS value) to spatial coordinates. Because Wi-Fi is… Expand.

To install wireless cameras for security and other tasks, such as monitoring processes or controlling the street perimeter of a summer cottage. Prior to 2012, the available options were limited to D1 analog wireless video transmitters on 2.4 GHz and 5.8 GHz. These RF or analog wireless transmitters have been limited to line of sight, which means there must be an unobstructed view between the antennas connected to the receiver and transmitter. Although this requirement was feasible for outdoor use, it was impossible to use these devices at other sites due to interference from various obstacles.

Thanks to the latest advances in CMOS technology, it has been possible to significantly reduce the price of IP cameras, so now every customer can purchase a high-definition camera. At the same time, prices for wireless access equipment have become affordable, and Wi-Fi radio technology has become more reliable. Since 2015, it has become possible to combine an IP camera with an access point and make the camera wireless. You can use any IP based network camera and use a 2.4GHz or 5.8GHz hotspot.

Better signal penetration. Wi-Fi signals, like your home router, are better able to penetrate obstacles without video signal loss.

Less interference. By selecting certain channels within an AP, it is easy to avoid interference from nearby Wi-Fi sources. In addition, the choice of 2.4GHz and 5.8GHz radios, along with the use of a MIMO-based access point, makes it easy to avoid interference from conventional Wi-Fi signals.

Even more cameras. Wireless access points can work with multiple network devices. Depending on the capacity of the indoor radio, its constant bandwidth, transmission distance and resolution of the transmitted video, up to four IP cameras can be installed per radio.

Disadvantages of using Wi-Fi hotspots for wireless transmission of IP video. (Fig.1). There's only one downside we could think of: the video will be delayed rather than being streamed in real time. Depending on the strength of the received signal, camera type and resolution, and the software used, the video will be delayed. If you're waving your arms in front of the camera, it can take anywhere from 50ms to a couple of seconds to replay the action on the receiving side.
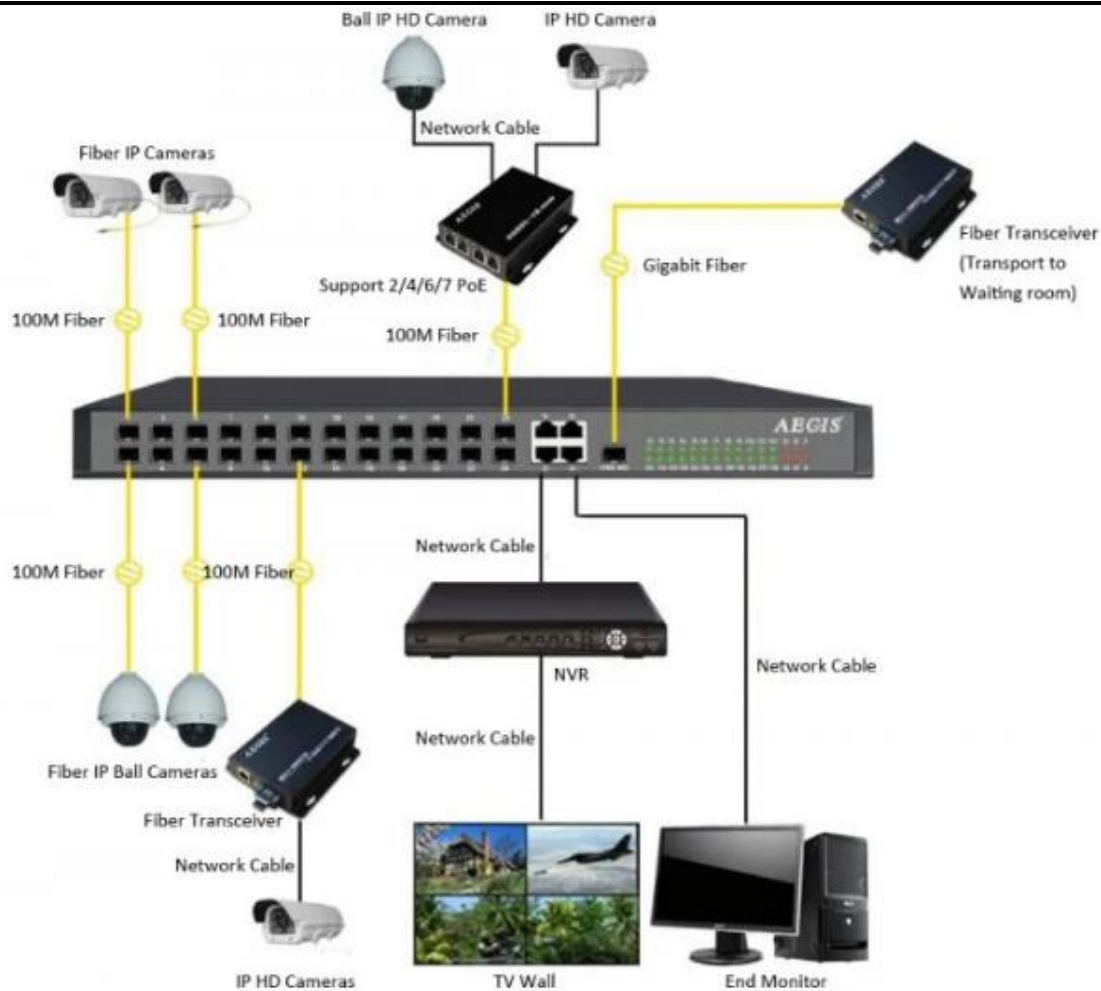
Fig.1. Wi-Fi for wireless transmission of IP video

Use of two access points for stable and wireless communication over long distances.

Conclusion. With the help of these analytical programs and devices, the problem of passenger traffic can be solved. This solution can also be applied to similar types of problems.

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