

Application of intelligent applications for controlling software and hardware devices

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Abstract. This paper will show how to apply the smart application "Smart Drinia Tech" which serves to control software and hardware devices. It will show how to work with this web application, what are the advantages and disadvantages of this application and how much use this application finds in Kosovo. This paper will provide us with general knowledge about the use of the application "Smart Drinia Tech" in computer systems, first the web will be shown and then how to connect to this application. The practical work of this application will also be analyzed, where some pictures of different types of devices that make the distribution of the Internet in local offices or homes, which are controlled and configured through the application "Smart Drinia Tech" will be displayed. This tutorial will help many internet users learn how to control their devices at home without the need for additional costs.

Keywords. *Application, equipment, controls, verification*

1. Entry

XXI Century - (21) is considered as the century of technology where technology is advancing more and more, where everyone is becoming more and more dependent on this development. The technological parts from year to year have changed human life, making work and life easier, taking into account the past years that technology had not been developed and works in all areas have had great difficulties, comparing nowadays, technological development is enabling us to work easier and live a safer life. With digital technology spreading everywhere. The main role in this development process is played by the Internet, which is enabling us to perform any action online, this is done only thanks to the equipment we have in our homes, offices or premises. There are several large and well-known companies in the world which make the production of internet devices such as. Modem, Wireless, OLT, switch etc. and import them to many countries of the world as well as to our country. There are already companies in Kosovo that deal with the control and configuration of Internet equipment, i.e. software and hardware control, all this work is performed by IT Engineers. All the devices are first checked one by one by the hardware for whether they are physically damaged or wet with water, then the software control part is performed by connecting the devices through different ports with optical cable and adapter, after the device turns on we enter the application "Smart Drinia Tech" and will be shown online. Use the mouse to select the device and send it to the configuration, where after 10 minutes the device is ready for use. device OLT (OPTICAL LINE TERMINAL) which allows us to perform all control and configuration with complete success, this device also shows us the software damage which may occur during configuration or damage resulting from voltage. Usually the equipment configuration in Kosovo is done

according to the customer's request, there are several different types of equipment where some of them have access with Huawei OLT (optical line terminal) and some others have access with ZTE OLT (Internet Distribution Equipment) . The types of devices we work with are: Huawei, ZTE, Alcatel, Nokia, Technicolor, Nucomm. Some of them are just modems while some are wireless modems. Devices like Huawei, Alcatel, Nokia, are configured through Huawei OLT with optical cable while devices like Technicolor and Nucomm are made through coaxial cable via switch by accessing the internet first. Whereas through OLT ZTE can be checked and configured only ZTE equipment that there are several different types.

1.0 Smart aplikacioni “Smart Drinia Tech”

Web applications are those that can be accessed through the internet. They are installed only once and are very convenient for users. They are also easily accessible from anywhere where the internet is used. Web application development relies entirely on the connection and speed of the internet.

We have different types of smart applications that have very important use in daily life, including in various fields such as medicine, economics, trade, education, science, etc. Thanks to these applications, work and life have become much easier. Smart application "Smart Drinia Tech" is a web application which is widely used in the field of computer networks, smart application is used to configure various devices that allow us to access the Internet. Including different types such as Modem, wireless, Onu, etc. To use this application, we must first turn on the server and the computer, it is necessary to have internet access through which it enables us to perform configurations and testing of various network devices. This smart application in case of any change in the system is automatically updated and the data is not deleted. After we start the server and the computer we open a browser and with the relevant link www.smart.drinia.tech we enter the application, where at the moment we are shown the web page through which we have to access with the appropriate username and password which is enabled by the web administrator.

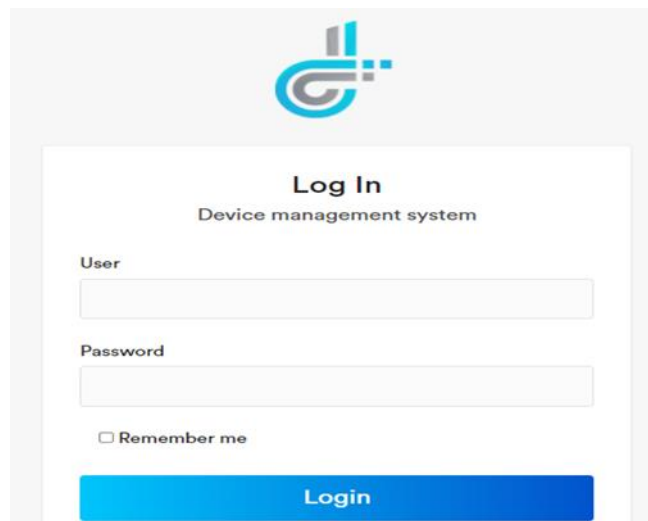


Fig.1. Log in to the smart drinia tech application

Advantages:

- Browser applications require little disk space on the client;
- No renewal procedure is required because all new options that appear are implemented on the server and are automatically usable by the user.

- Web applications are easily integrated into other server-side procedures, such as email and search engines. They also offer compatibility on most platforms like (Windows, Mac, Linux, etc.) because they operate within a web browser window.

Shortcomings:

They depend entirely on the availability of the server to enable the application. If a company goes bankrupt, and the server is down, users will no longer be able to access it. The company can theoretically see everything the user does. This can cause privacy issues. It is also worth noting the risk to various viruses.

2.0 Using Smart Drinia Tech

After completing the login if we have successful access to the web application we are enabled to use the program to configure and test different types of devices. First we are presented with the main menu that offers us the opportunity to choose what work we want to do, after opening the application to its left appears the main menu table, through which we can act in any row.

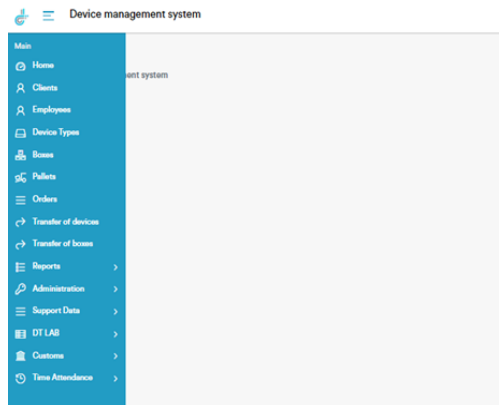


Fig.2.The main page

2.1 The work performed by Smart Drinia Tech

After opening the main menu, the web application is ready for configuration and testing for devices, to start working with the configuration program you must first click on the DT Lab option, as shown below the options allow us to choose what device to work with, e.g. if we are going to work with ZTE we have to choose the ZTE OLT option.

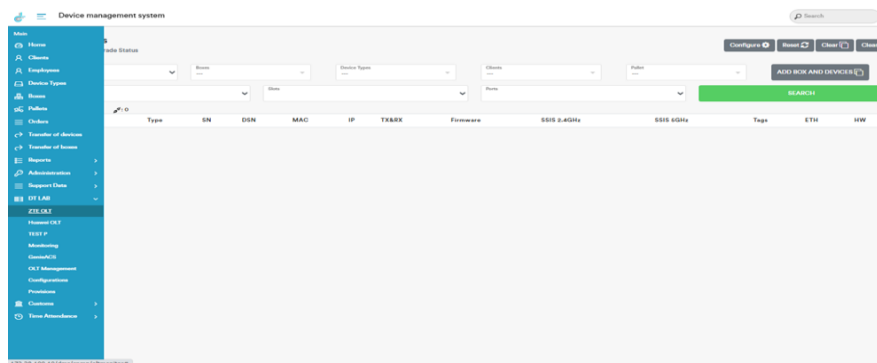


Fig. 2.1. Option DT Lab

Usually a message from the client contains about 6000 devices, after we have received the devices the ports that will connect those devices must be checked, after checking we take the devices and connect them one by one through the ports, there are 8 ports which can be used, number of ports depends on the size of the OLT the larger the OLT the more ports we can connect, but in our case there are only 8 ports. 25 devices should be connected in each port, while only 20 devices should be included in the box, this is done for security and time reasons, because it happens that during configuration or testing any device has a defect and for that reason we connect 25 devices to the port, each device is connected to an optical fiber adapter. Once we have connected all the devices through the ports, the wait is 5 minutes until all of them are activated.

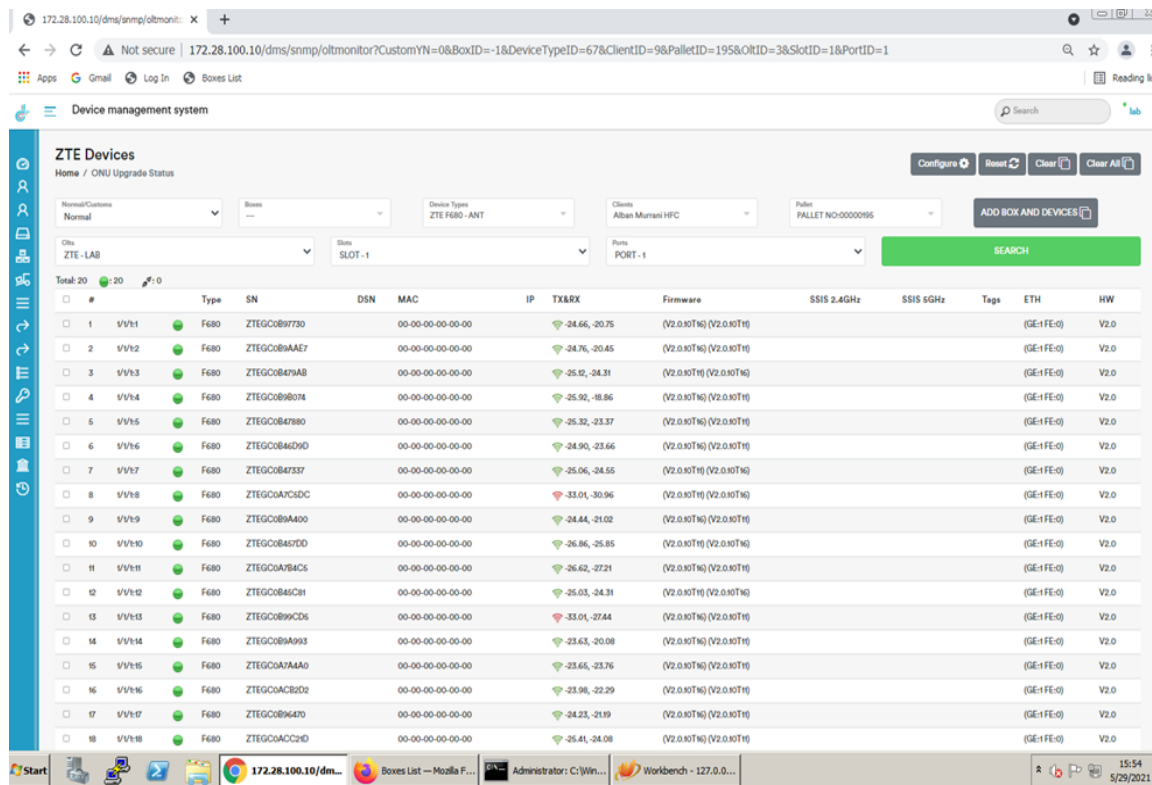


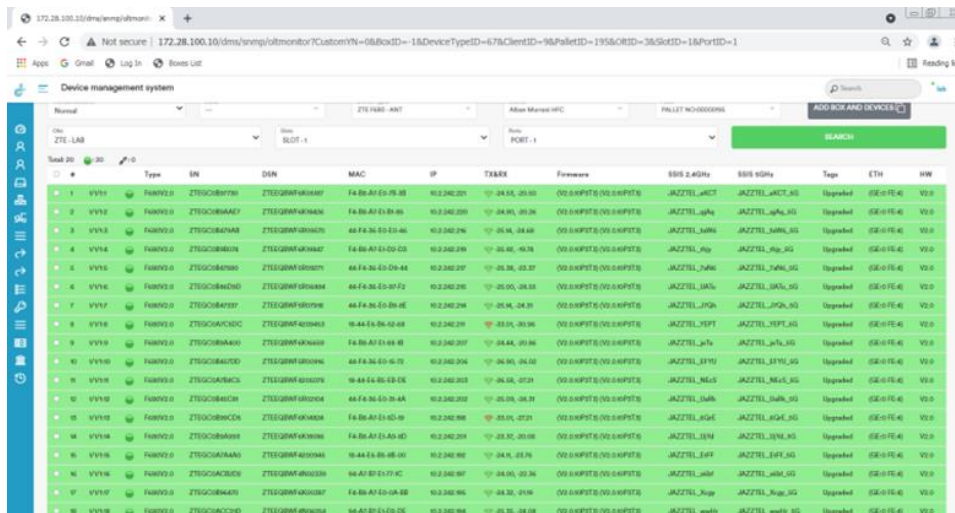
Fig 2.2 Online devices before configuration

Fig. 2.2 shows what the devices we connected to the ports look like, since all devices are online and ready for configuration we have to choose the type of normal order or custom, if the order is for Kosovo then it is selected normal, and if the order is for any European country and will go through customs then costume should be chosen. The part of the box remains unchanged because this is done automatically, meaning the box is automatically identified at the time of its creation.

In the device type option, we have to choose the type of equipment that we have connected to the port and that we want to configure in this case we have ZTE F680-Ant, this determines the types of devices that are inside the box and it is mandatory to select the type of equipment otherwise we will have problems after continuing to work on the application, we will be unable to create boxes. The Clients option must be selected by the client who placed the order, in this case we have the client from Kosovo X, Y, the client part is not mandatory because it can be edited even after all the equipment configurations have been completed and placed in boxes.

OLT: it is mandatory to choose the type of OLT in this case if we have to choose the OLT of ZTE, because we are working with these devices, through OLT all configurations, tests and troubleshooting of devices are performed. The Slot option defines the ports connected to the OLT in this case we have to use Slot number 1 through which we are able to find the devices we have online. Whereas the Ports

option determines the types of ports from 1 to 8 in this case we have chosen port 1, and so on we have to check all the ports to see if all the devices are connected if we are shown 25 devices online then we have to count those in the respective port whether there are 25 devices physically. After we have checked the devices through the select all option all the devices should be selected and click on the configure option, we should wait about 10 minutes until all the devices get the configuration, and then this should be done with all ports in a row in the same way.



| ID | Type | SN | DSN | MAC | IP | TXRX | Firmware | SWS 2.4GHz | SWS 5GHz | Tag | ETH | HW |
|----|------|--------|------------|--------------|-------------------|-------------|-------------------|--------------|-----------------|---------|------------|------|
| 1 | VV11 | FAN000 | ZT50C8B776 | ZT50B8F46007 | F4-B6-A1-E3-78-38 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 2 | VV12 | FAN000 | ZT50C8B776 | ZT50B8F46008 | F4-B6-A1-E3-78-39 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 3 | VV13 | FAN000 | ZT50C8B776 | ZT50B8F46009 | F4-B6-A1-E3-78-40 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 4 | VV14 | FAN000 | ZT50C8B776 | ZT50B8F46010 | F4-B6-A1-E3-78-41 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 5 | VV15 | FAN000 | ZT50C8B776 | ZT50B8F46011 | F4-B6-A1-E3-78-42 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 6 | VV16 | FAN000 | ZT50C8B776 | ZT50B8F46012 | F4-B6-A1-E3-78-43 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 7 | VV17 | FAN000 | ZT50C8B776 | ZT50B8F46013 | F4-B6-A1-E3-78-44 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 8 | VV18 | FAN000 | ZT50C8B776 | ZT50B8F46014 | F4-B6-A1-E3-78-45 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 9 | VV19 | FAN000 | ZT50C8B776 | ZT50B8F46015 | F4-B6-A1-E3-78-46 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 10 | VV20 | FAN000 | ZT50C8B776 | ZT50B8F46016 | F4-B6-A1-E3-78-47 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 11 | VV21 | FAN000 | ZT50C8B776 | ZT50B8F46017 | F4-B6-A1-E3-78-48 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 12 | VV22 | FAN000 | ZT50C8B776 | ZT50B8F46018 | F4-B6-A1-E3-78-49 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 13 | VV23 | FAN000 | ZT50C8B776 | ZT50B8F46019 | F4-B6-A1-E3-78-50 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 14 | VV24 | FAN000 | ZT50C8B776 | ZT50B8F46020 | F4-B6-A1-E3-78-51 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 15 | VV25 | FAN000 | ZT50C8B776 | ZT50B8F46021 | F4-B6-A1-E3-78-52 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 16 | VV26 | FAN000 | ZT50C8B776 | ZT50B8F46022 | F4-B6-A1-E3-78-53 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 17 | VV27 | FAN000 | ZT50C8B776 | ZT50B8F46023 | F4-B6-A1-E3-78-54 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 18 | VV28 | FAN000 | ZT50C8B776 | ZT50B8F46024 | F4-B6-A1-E3-78-55 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 19 | VV29 | FAN000 | ZT50C8B776 | ZT50B8F46025 | F4-B6-A1-E3-78-56 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 20 | VV30 | FAN000 | ZT50C8B776 | ZT50B8F46026 | F4-B6-A1-E3-78-57 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 21 | VV31 | FAN000 | ZT50C8B776 | ZT50B8F46027 | F4-B6-A1-E3-78-58 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 22 | VV32 | FAN000 | ZT50C8B776 | ZT50B8F46028 | F4-B6-A1-E3-78-59 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 23 | VV33 | FAN000 | ZT50C8B776 | ZT50B8F46029 | F4-B6-A1-E3-78-60 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 24 | VV34 | FAN000 | ZT50C8B776 | ZT50B8F46030 | F4-B6-A1-E3-78-61 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |
| 25 | VV35 | FAN000 | ZT50C8B776 | ZT50B8F46031 | F4-B6-A1-E3-78-62 | 0.0.246.201 | 00-00-00-00-00-00 | JAZZTEL_4KCT | JAZZTEL_4KCT_3G | Updated | 08-0-1E-4E | V2.0 |

Fig. 2.3 Online devices after configuration is complete

In fig.2.3 are displayed the devices after configuration, meaning that the devices are successfully configured, the devices that are configured change color from white to green. Here is the first port that after sending the configuration within 10 minutes, all devices have been successfully configured, and have received the appropriate signature. Select all the devices and click on the Add Box and Device option, where the box is automatically created and identified automatically. Then we select all the devices again and click on the Reset option and wait 10 seconds until all the devices are reset, after the devices have been reset in the respective port, we take them one by one and put them in the box we created. We do the same with other ports. Until the end to the last port port 8. At the moment we have completed all the ports and put them in different boxes. Click the Clear All option to delete the serial numbers of the devices that have been performed, this is done so that we do not have any hassles in the application.

3.0 Smart application iManager U2000

Huawei iMaganger U2000 network management system is the Huawei network management solution, it serves for the management and maintenance of data communication devices. To install this smart application, it requires that the computer operating system is not older than Windows Server 2008, otherwise it cannot be installed. The server operating system can identify a memory size of only 32 GB or higher. If the physical memory of the server exceeds 32 GB, the U2000 can be properly installed, can only be installed on disk C. If the u2000 is different from the patch versions of the OS on the live network, it is recommended to reinstall the u2000 and the parts of the version required to ensure that it works properly.

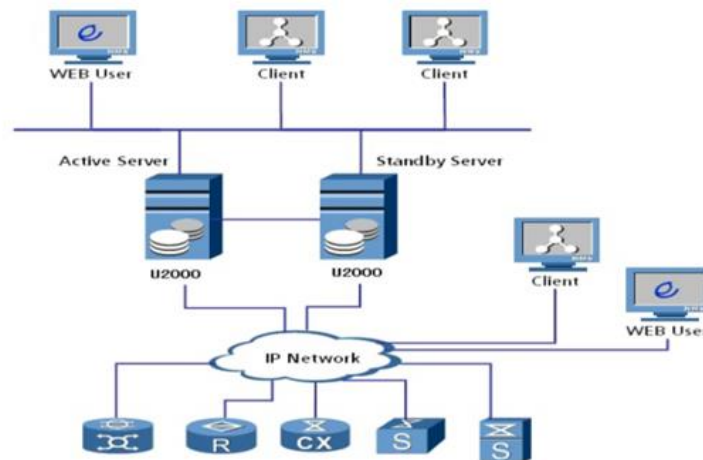


Fig.3.1. Scheme of iManager u2000 smart application

In fig.3.1 you can see the diagram of how the smart application u2000 works, which after installation automatically connects to the IP address of the server and network. System IP address: this IP address can be used to access the server for operating system management and maintenance as well as U2000 communication. Once the U2000 program is installed on the computer device, click on the icon that appears on the desktop which opens the login section.

3.1 Using the iManager U2000

The U2000 offers comprehensive management functions in the element management layer and the network management layer. Once we have accessed the program, the main menu appears, through which we can choose the work we want to perform, because with this program we can perform many other tasks besides the maintenance and configuration of network equipment. But we only need it for the configuration and maintenance of network technological equipment.

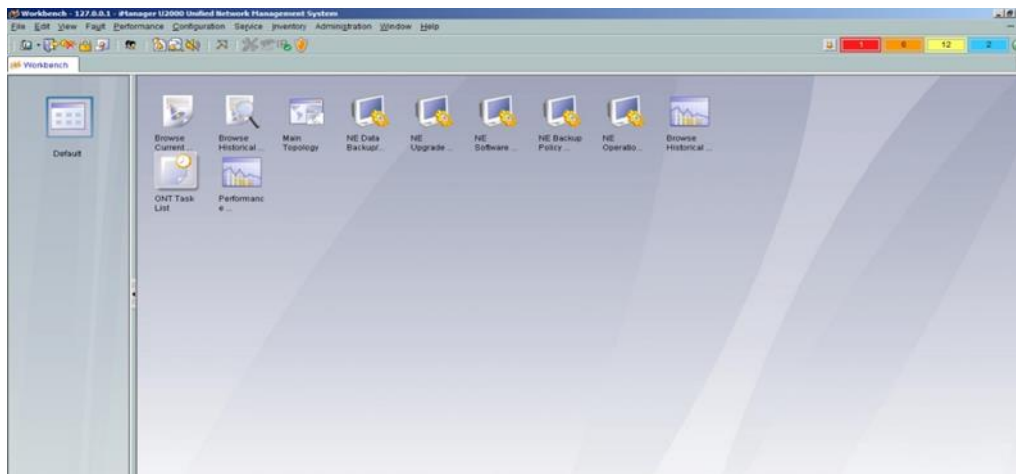


Fig. 3.2. The main way after logging in to the application

Figure 3.2 shows the way which is shown to us after we are logged in, this page contains different rows and columns with options. But in this case we only need the Main Topology option. We click on this option where then the next page opens that allows us to enter the part where the domain selection is made.

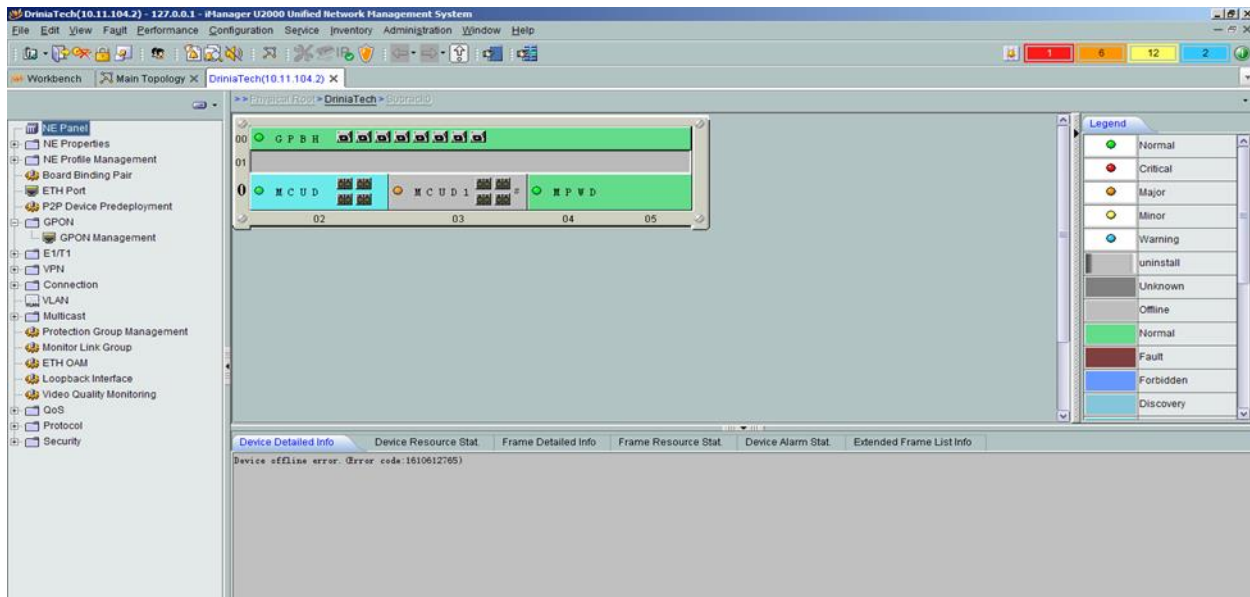


Fig.3.3. G-pon management page

Figure 3.3 shows the new page which allows us to choose the work we will do, but in this case we will use G-pon Management, which is used for equipment maintenance. Huawei GPON and Access Management Supports the management and monitoring of the broadband access network, GPON eSight ensures the stable operation of GPONs and networks by monitoring ONU, OLT, GPON connection and ports. Gigabit passive optical networks is a fiber optic technology (GPON Technology) that allows a higher speed of transmission and reception of data through a single fiber. With a point-to-point architecture, it will enable fiber optics in the home, or a building.

A GPON network is capable of transmitting Ethernet, TDM (Time Division Multiplexing). A GPON network consists of OLT (Optical Line Terminals), ONU (Optical Network Unit) and a splitter. GPON uses both upstream and downstream data through Optical Wavelength Division (WDM) Multiplexing. GPON is an access network. Its main feature is the use of passive separators in the fiber distribution network, enabling a single nutrient fiber from the provider to serve multiple homes and small businesses.

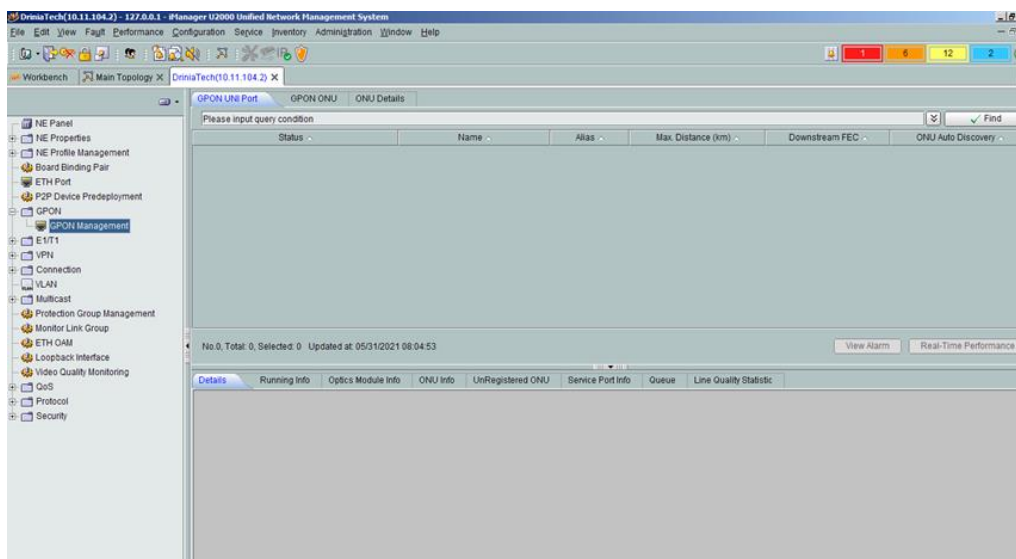


Fig. 3.4. Home G-pon ONU

In figure 3.4 a new window appears after we clicked on the G-pon management option, so the main menus can be seen. G-pon onu port in this part if we click the Find option we will be shown all the ports and how many devices are online in each port, through this option we can control the ports.

G-pon onu: Through this option we can control all high-end devices which are connected to all ports, i.e. we can control them all one by one, that the moment the devices are OK we get the green light which means that the devices are online and ready for configuration, so if the devices are red light then we have to select them and delete them from the program.

3.2 Functions of the U2000 application

The U2000 software reliability mechanism enables the U2000 to resist software failures such as software application failure or database damage. The U2000 has automatic protection mechanisms so that it can monitor and control the operation of processes his. When U2000 detects that a process is abnormally stopped or is faulty, it will be faulty. Registers system logs, then the system restarts the process automatically and ensures that the process is working properly. The system can also generate an alarm that prompts a user to manually resolve the issue. In the case of a system or when the active server is faulty (for example, software applications fail or the database abruptly terminates) the switch is made between the active server and the standby server, and then the standby server starts monitoring the networks. Periodic and effective data backup U2000 ensures that the system operates stably and is immediately recovered from defects. The U2000 offers a variety of data backup methods for details. The performance management function collects performance data of equipment, functions, services, or other objects periodically or after they are triggered, to record the status of the operation.

Supports the following operations: Configure the mirroring of Ethernet ports to facilitate the delivery of maintenance packages.

Configure internal Ethernet interfaces, including:

- Basic attributes
- Traffic control
- Tag attribute
- Network attributes
- Connected paths
- Advanced attributes

Configure external Ethernet interfaces, including:

- Basic attributes
- Flow control
- Tag attributes
- Network attributes
- Advanced attributes

4.0 OLT (Optical Line Terminal)

Optical line termination which is also called optical line terminal, is a device which provides passive optical network.

It performs two functions:

- To perform the conversion between electrical signals from equipment and service and fiber optic signals used by the passive optical network.
- To coordinate multiplexing between conversion devices at the other end of this network called (optical network terminals or optical network units),

Passive optical networks are telecom systems that transmit data through fiber optic connections. They are referred to as passive due to their use without power to transfer data from a central point to multiple destinations. As a result, the primary transmission line is divided into 32 individual branches connected to the main OLT.

Compared to the point-to-point architecture, the point-to-point connection is supported by PON requires less physical infrastructure. This minimizes the need to build individual lines for each endpoint, which makes it a more economical solution for accessing the Internet. Technological developments in the field of passive optical network systems focus on meeting the growing demand and broadband solutions. A standard PON contains multiple OLT and ONU interfaces that are connected by fiber optic cables. The OLT device allows the integrated management of a PON and also the collection and distribution of optical signals from all ONUs.

Figure 9 shows the optical modulator which enters the OLT ports, and inserts the optical cable that connects to the Switch and enables multiple outlets through the ports for the configuration and control of ONU devices.



Fig. 4.1. OLT connected with optical fiber and modulators

4.1 Use of OLTs

There are two functions performed by the OLT, and the main function of the OLT is to control the information that circulates throughout the optical distribution network, going in both directions while located in a head office. The maximum distance supported for transmission via ODN is 20 km.

OLT has two scoring directions: upstream (receiving a different type of data traffic and voice distribution from users) and downstream (receiving data, voice, and video traffic from the subway network, or from a long haul network and send all ONT modules to ODN. A laser in OLT injects photons from the base into a fiber optic cable made of glass and plastic ending in a passive optical splitter, the splitter breaks the single signal from the central base to multiple signals that can eventually be distributed to up to 64 clients.

When you are setting up fiber internet in your home or office, you come across an extensive list of shortcuts to understand. Among that list are things like PON, ONT, OLT, ONU, and more. Trying to understand these cuts and how they work together can be overwhelming. We will go through what you need to know and why. This way, you can better understand your Internet Service Provider (ISP) when purchasing and installing Fiber Optic Services (FiOS) in your space. OLTs are also widely used in businesses, schools, hospitals, factories, etc. Ex. in a small business or local on average, 4-port OLT is used. Large high-capacity OLTs with up to 120 ports are used in factories and hospitals.



Fig. 4.2. OLT with 120 ports

Figure 10 shows a type of OLT device which is used for large spaces such as in hospitals, factories, etc. And there are a total of 120 ports also this device has high capacity and performance and it is very simple to place the modulators through the ports. GPON interfaces are used to connect the optical distribution network (PON). You can connect up to 128 prepaid optical terminals via a single thread for each interface. Operator's transport network access is provided through 10 Gigabit or combined Gigabit connectivity interfaces. OLT allows the operator to build scalable, fault-tolerant networks to ensure the highest standards of security. OLT manages equipment, traffic flow and connection to the transport network. Broadband access using FTTH technology is the version with the highest quality of service delivery, as it provides high data rate over long distances. The main advantage of PON technology is the lack of active nodes with electricity within the section from OLT to ONT, which greatly reduces the cost of operating the network. Moreover, PON technology saves on cable infrastructure by reducing the total length of optical fibers, as only one fiber for a group of up to 128 subscribers is used within the section from the central node to the splitter. OLT supports 2 surplus units that can be exchanged with heat.

4.2 OLT configuration

OLT can be configured and managed via the local terminal connection or a telecom using Telnet. OLT supports three methods to gain access to management and configuration tasks: You must configure your computer's IP at 192.168.8.X (Except 192.168.8.100), connect to the OLT gateway link above, login in OLT with the default OLT management IP in the band (default IP: (192.168.8.100)). The default login ID is the administrator. does it match the server version?

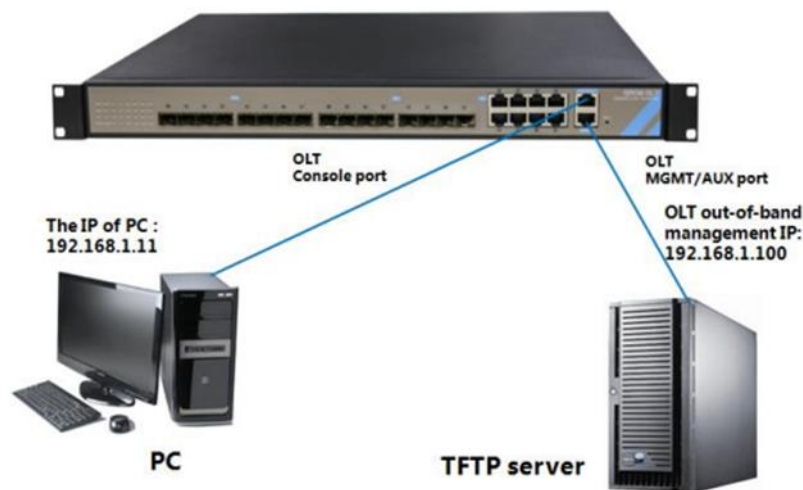


Fig. 4.3. OLT Hardware Connection Scheme

Figure 11 shows the hardware diagram of how the devices should be connected to each other before configuration begins, the devices are connected to the mains and the cable. After updating the firmware online, you do not need to restart OLT. Check if the online signature is correct. The username and password of the web management system is admin / admin. This username and password can be modified in the web interface and do not affect the other way of logging in. Only when the ONU successfully registers OLT can you configure the ONT service

The input mode is usually used for the port that connects to PCs or other terminals, only one VLAN can be configured. The mode usually used for the port connecting to the switch one or more VLANs can be configured. Hybrid mode can be used for port connected to PC or switch. The default VLAN mode is hybrid.

In order to convey messages quickly, a device must maintain its own MAC address table. The MAC address table contains the MAC addresses associated with the device, ports, VLAN, type, and status. Dynamic MAC addresses in the table are learned from the device. The learning process is that: if port A receives a message, the device will analyze the MAC address.

You can use the Onu command in automatic mode to enable the ONU MAC control mechanism when registering

- Do not turn off the power when updating. Upon completion of the update, OLT will notify the ONU if it successfully updated and reset the ONU with the new firm.
- Once the ONU is updated and restarted, the OLT will send the executed command to confirm the version.
- Please delete the firmware and update the settings by stopping the update command.
- Display the ONU update progress via the command show updated update status.
- Display the ONU update settings using the command display information update.
- Stop updating the ONU by stopping the onu stop command

Start performing the configuration, configure the ONU management IP as follows

```
EXAN#configure terminal
Enter the configuration commands, one per line. End with CTRL/Z.
EXAN(config)#igmp enable
EXAN(config)#igmp snooping-aging-time 100
EXAN(config)#igmp bandwidth-control enable
EXAN(config)#igmp span-vlan enable
EXAN(config)#igmp forward-cvlan enable
EXAN(config)#igmp non-match-group drop

EXR10(config)#show igmp
IGMP global parameters:
-----
IGMP is globally enable.
IGMP v1 mode is accept.
IGMP v2 mode is accept.
IGMP v3 mode is accept.
IGMP log is enable.
Snooping aging time is 100 seconds.
Span vlan is enable.
Forward cvlan is enable.
Bandwidth control is enable.
Host tracking is enable.
Robustness variable is 2.
General query interval is 125(second).
Query max response time is 100(0.1second).
Last member query interval is 10(0.1second).
Last member query count is 4.
Unsolicited report interval is 10 seconds.
Non match group is drop.
```

Fig. 4.4. OLT configuration command

Figure 4.4 shows the command that shows which commands are used to configure an OLT, all this is achieved through the CMD application. In the optical link protection system, the ONU must maintain the status of the register at the time of retention. Start in privileged configuration mode, configure optical connection protection. the default system will have a model ID0, the parameters of this model cannot be modified, all onu when creating the default connection in the model. Each ONU must enter a DBA. When the ONU is configured by the template and the standalone command at the same time, the configured standalone settings are effective. Once you have modified the settings, you must reset them so that these settings can take effect the next time it restarts. If you need to reset to factory defaults, you can use the following commands to delete all configurations. Once deleted, the device will restart automatically.

```
ZXAN#show onu-type gpon
Pon Type Onu type Description
-----
gpon ZTE-9806H 2ETH
gpon ZTE-F601 1ETH
gpon ZTE-F621 6ETH,4E1
gpon ZTE-F621A 6ETH,4E1
gpon ZTE-F622 4ETH,2POTS
gpon ZTE-F625 4ETH,2POTS,1RF
gpon ZTE-F628 6ETH,2POTS,1RF,1WiFi
gpon ZTE-F640 1ETH,2POTS,1RF
gpon ZTE-F641 4ETH

ZXAN#show gpon onu uncfg gpon-olt_0/5/1
OnuIndex      Sn          State
-----
gpon-onu_0/5/1:1 ZTE_06120664 unknownt

ZXAN#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
ZXAN(config)#interface gpon-olt_0/5/1
ZXAN(config-if)#register 1 type ZTE-F622 ZTE_06120664 state ready

ZXAN(config-if)#show gpon onu state gpon-olt_0/5/1
OnuIndex      Admin State  Omcc State  O7 State  Phase State
-----
gpon-onu_0/5/1:1 enable      enable      operation  working
```

Fig. 4.5 CMD software after OLT configuration

Conclusion

In this paper I have tried to present some data related to the use of various smart applications for testing and controlling network devices. Nowadays the internet is an inseparable part of life, where it finds great use in many areas of life, which has made our lives much easier, so all this has been made possible thanks to various devices which make the distribution of the internet from the base to the client. I have tried to show in the simplest and most understandable way for everyone, how to use the Smart Drinia Tech application, showing with different figures the application, its configuration and its use, also devices of different types different with their complete data. So this paper will be very understandable by all interested.

The main role in this development process is played by the Internet, which is enabling us to perform any action online, this is done only thanks to the equipment we have in our homes, offices or premises. There are several large and well-known companies in the world which make the production of Internet devices such as. Modem, Wireless, OLT, switch etc. and import them to many countries of the world as well as to our country. It is worth mentioning that in this paper we have done the software control (configuration, firmware change) and hardware control (Optical Adapter change) and we have made every device to be well controlled, so that when they reach the client they do not appear various hardware or software problems.

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