Innovation business and projects

Implementation of 5G technology

Kazakhtelecom JSC is actively testing and successfully implementing 5G technologies in the Republic of Kazakhstan. In 2021, the Protocol of the Interdepartmental Commission on Radio Frequency of the Republic of Kazakhstan, chaired by Prime Minister of the Republic of Kazakhstan No. 17-04/07-1000 of 31.08.2021, was approved. Under this Protocol, Kazakhtelecom JSC launched its own 5G spot in Astana Hub in Nur-Sultan and in the central square of Shymkent. In October 2021, the Company also launched a 5G spot in Rixos Turkey.

All of the above hot spot were launched for testing and demonstration of eMBB (mobile 5G) and were deployed in the C-group in the most recommended and popular radio frequency range in the world. The company ensured the integration of 5G NR base station into the existing LTE network, i.e. the 5G pilot network is deployed in NSA (Non-Standalone) mode using the existing core of the LTE network.

Launch of Fixed Wireless Access

In 2021, Kazakhtelecom JSC launched the FWAs network in Shymkent for fixed wireless Internet access. To launch the network, the Company used the following key technical solutions:

1. A separate range of radio frequency (band 40) to prevent interference is the weakening of the signal due to the overlapping of radio wave with each other;

2. LTE as an access ensures the highest efficiency (bit/Beta) of using radio frequency in the range (band 40) compared to other wireless access technologies;

3. A SIM-based approach makes it possible to manage services flexibly;

4. IP breakout provides a dedicated PGW connection to the Internet for FWAs;

5. The 4T4R base stations used provide a large network capacity for fixed FWAs and allow aggregation of several carriers in the future;

6. In the Core domain, a technical solution is used with network function virtual based on NFVi infrastructure, i.e. all Core elements are implemented as VNF;

7. The subscriber access domain uses specialized CPE (1T2R) terminals for a fixed wireless connection. A network has been launched in certain regions in the cities of Shymkent, Nur-Sultan (South-East), Almaty (Algabas) and Kosshy;

8. Rollout of the FWAs network in Nur-Sultan and Almaty has also started.

Information security

Cloud video surveillance

Kazakhtelecom JSC intentionally began preparations for the organization of its own ECIB and the receipt of an ECIB license. In 2021, all necessary information security certificates were received in accordance with the qualification requirements:

> GIAC Reverse Engineering Malware (reverse engineering);

> EC-Council CHFI (investigation of computer security incidents);

> EC-Council Ethical Hacker;

> RedHat Certified System Administrator Exam.

The Company has undergone audits of Samruk-Kazyna JSC and NSC RK to provide information security services. Kazakhtelecom JSC also obtained official permission to provide information security services, thereby confirming its competence. At this stage, a product is being prepared for critical infrastructure in our country.

To date, more than 34,000 video cameras in 17 cities of the Republic of Kazakhstan have been installed on the platform of Kazakhtelecom JSC. Integration of Kazakhtelecom's JSC cloud video surveillance system in the operational management centers of the Ministry of Internal Affairs of the Republic of Kazakhstan has been completed. As part of the integration, the Company has performed the following tasks:

1. Video traffic from 34,000 approach video cameras was brought out in stages during 2021 in 17 major cities of the Republic of Kazakhstan. Video cameras are installed on the entrance group and inside the entrances of apartment buildings. Video flows are transferred to the regional operational centers of the Police Departments in each city;

2. Video traffic from all approach video cameras to the National Center of the Ministry of Internal Affairs of the Republic of Kazakhstan in the city of Nur-Sultan has been ensured. In total, video traffic from 17,000 entrances is transferred to the Central Department of the Ministry of Internal Affairs of the Republic of Kazakhstan;

3. A productive and reliable optical network infrastructure has been organized for the Ministry of Internal Affairs of the Republic of Kazakhstan at the level of 10 Gbit/with the aim of transferring video flows to the Central Department of the Ministry of Internal Affairs of the Republic of Kazakhstan. For this purpose, the FOCL was built before the Central Department of the Ministry of Internal Affairs of the Republic of Kazakhstan (where there was no technical capability) and the IP network applied was organized using switches and routers;

4. 13 computerized workstations were organized at the Central Department of the Ministry of Internal Affairs of the Republic of Kazakhstan in the cities where this was necessary, with access to the cloud video surveillance platform of Kazakhtelecom JSC to monitor video flows online and video archive.
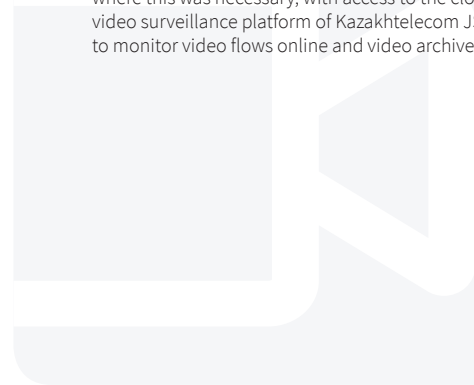
Working with content providers

VIDEO SURVEILLANCE SYSTEMS IN PUBLIC PLACES OF NUR-SULTAN

In 2021, the Corporate Business Division successfully developed new client video surveillance projects. A particularly topical topic was "Public security", where in the cities of our country the video surveillance system is implemented not at the level of private companies, but at the level of the city, creating a powerful tool for prompt monitoring of the work of various city services. These systems make it possible to monitor the situation in public places and monitor the work of the municipal services responsible for removal of snow, waste collection, etc.

Today, urban video surveillance systems are an integral priority component of the smart city ecosystem, striving to be as safe and comfortable as possible for its residents. For example, Nur-Sultan has implemented projects to install video surveillance systems in public places at 118 sites.

In December 2020, the Akimat of Nur-Sultan and Kazakhtelecom JSC concluded a Memorandum on the implementation of this project. As part of the Memorandum, a full pre-project inspection was performed and a project was developed to equip a video surveillance system for all healthcare facilities with a total of 1 877 cameras connected to the cloud video surveillance platform, with additional backup on local video servers at each facility.

Having access to video surveillance cameras of the facilities of the institution, the Healthcare Department has the opportunity to promptly monitor situations at healthcare facilities, which leads to an increase in security for visitors to institutions.

These projects made it possible to demonstrate the Company's ability to implement large-scale urban video surveillance projects and are successful cases for further copying in other regions of the country, since for state clients one of the important triggers when making a decision is the availability of implemented cases in the Republic of Kazakhstan.

In 2021, the Company in total expanded its local content provider cash servers by more than 1 200 GB/s of traffic. During the period of total traffic growth, the Company implemented a number of initiatives to optimize access to content:

1. An additional cluster of caches of one of the largest CDN operators has been organized. As a result, access of broadband internet subscribers to such web resources and content as: Adobe, Apple, Amazon.com, BC, Steam, IBM, GitHub, L'Oréal, Microsoft, NASA, Nintendo, NVIDIA, Sony, Uranium, Red Hat, Reuters, Ys;

2. Additional clusters of Google caches in Almaty and Nur-Sultan with a total capacity of 400 Gbit/s have been expanded. In this way, access to mainly Youtube video content is optimized, as a result 89% of video views take place in the following quality: Traffic is consumed from the distributed CDN network in 12 cities in Kazakhstan;

3. Additional clusters of Facebook/Meta caches have been organized in Almaty and Pavlodar with a total capacity of 600 Gbit/s. For example, the Company optimized access to Facebook, Instore, IGTV/Reels content for the southern and northern regions of Kazakhstan;

4. Kazakhstan has built the first 80 Gbit/s cash cluster in Kazakhstan;

5. The first cluster of one of the largest CDN operators with a total capacity of 40 GB/s was built. Work is already underway to further expand it by 2 times.

As a result of 2021, more than 2.5 Tbit/s were installed from Google, Facebook, Cloud flare, Akamai, Yandex, Stream, etc. Direct screening with Microsoft has also been arranged. Direct screening (connection) makes it possible to qualitatively improve access to content and products from Microsoft, such as Microsoft Teams, Microsoft Office 365 and Microsoft Azure services. In future, the Company plans to improve its access to Microsoft Group gaming products, including delays (pings) for Kazakhstan gamers.