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THE IMPORTANCE OF THE APPLICATION OF MQTT PROTOKOL IN THE REMOTE CONTROL OF RAILWAY AUTOMATION AND TELEMECHANICS DEVICES

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ANNATATION

The article is aimed at improving the use of railway transporti control systems and studying the possibilities of remote control of information about devices. It is dedicated to the issue of modeling processes and the use of microprocessor devices to solve these problems, increasing efficiency and reliability. To solve these issues, software, methods and techniques for microprocessor devices were developed.

Keywords: Railway transporti, MQTT, modelling, IoT, TCP/IP, wildcard.

INTRODUCTION

World transportation process control systems automation, the introduction of systems implemented on the basis of microprocessor technology in the continuous control of the state of train traffic control devices, the improvement of control methods and technologies, such issues occupy one of the leading positions. Therefore, in the process of ensuring security, it is necessary to introduce into practice diagnostic systems that increase the operational reliability of automation and telemechanics devices at railway stations, which are implemented on the basis of microelectronics technologies. In developed countries of the world, such as the United States, Germany, Japan, England, China and Spain, it is important to design and create railway automation and telemechanics systems, to ensure their stability, reliability and self-control, as well as to develop sophisticated microprocessor systems that give the necessary information about their technical condition.

The development of automation tools on the basis of automation and telemechanics tools and equipment, which have elements of microprocessor technology, is the leader in ensuring the safety of moving content, improving the functionality of railway traffic management. We will consider the development of a device based on the Raspberry Pi microcontroller, which operates on 4G channel, for the control and monitoring of the state of railway automation and telemechanics devices. The Raspberry Pi microcontroller transmits data using the IoT theology through the 4G modem, which operates on a mobile communication channel. Us in this theology uses the MQTT protocol for the qualitative transmission of data. [1]

MATERIAL AND METHODS

MQTT or Message Queue Telemetry Transport is an easy, miraculous protokol of open exchange of information, created to transmit information to remote locations, where the code is small in size and there are restrictions on the capacity of the channel transfer. The above-mentioned capabilities provide opportunities for application in M2M (machine-to-machine interaction) and IoT (industrial Internet access) systems. The MQTT protocol works faster than IP / IP at the practical level and without any kind of origination conditions. [2]

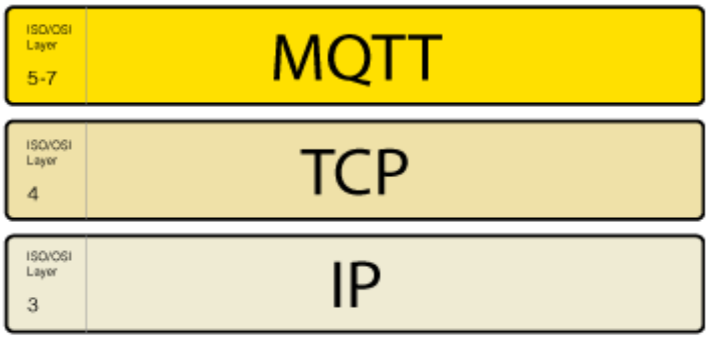

Figure. 1. Evaluation of ISO technologies for data transmission.

In the MQTT protocol, the exchange of messages occurs between a client (client), which can be either a message publisher or a subscriber (publisher/subscriber). The publisher sends the data to the MQTT broker, indicating in the message a specific topic, topic (topic). Subscribers can get information from many publishers depending on their membership in the relevant topics.

MQTT devices use certain types of communication with the broker, the main ones of which are listed below:

- Connect with Connect – broker (setting up alga)
- Disconnect – disconnect connection with broker
- Publish-print the information to the topic in the broker
- Subscribe-subscribe to the topic in the broker
- Unsubscribe-unsubscribe from the topical membership

The scheme of information exchange between the subscriber, publisher and broker is given in Figure 2.

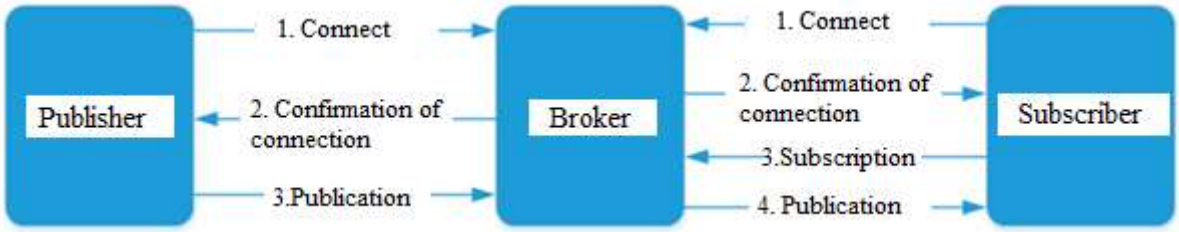

Figure 2. Scheme of information exchange between a subscriber, publisher and broker

In our case, the source of information in the role of the" publisher", more precisely railway automation and telemechanics devices, and as a" broker " means of information transmission, in place of the subscriber, information reflection devices (computer, smartphone) are used.

RESULTS AND DISCUSSION

The topics consist of symbols with UTF-8 encoding. The hierarchical structure of the finds has a "tree" format, which makes it somewhat easier to organize and retrieve data. The riddles are arranged in one or several levels, they are separated by the symbol"/". The following is an example of a topic publishing data to a broker that is the control sensor of the sending path in the ETS post:

/stansiya_1/put/put_1/status

Subscription can receive items from several topics at the same time, for which there is wildcard. They can be of two types: single-level and multi-level. In order to understand it relatively easily, we will consider each of them in examples. A stratified wildcard. For its use, the symbol "+" is

used. For example, we are obliged to receive information on the status of all receiving-sending routes of the station:

/stansiya_1/put/+/status.

As a result, we get data from the finds:

/stansiya_1/put/put_1/status;
/stansiya_1/put /put_2/status;
stansiya_1/put /put_3/status.

Multi-layered wildcard. To use it, the symbol "#" is used. For example, for information from different sensors of all objects of the station:

/stansiya_1/#

As a result, we get information from the finds:

/stansiya_1/svetofor/psv1/status;
/stansiya_1/svetofor/psv2/status;
/stansiya_1/svetofor/msv1/status;
/stansiya_1/strelka/st1/status;
/stansiya_1/strelka/st2/status;
/stansiya_1/put/put_1/status;
/stansiya_1/put/put_2/status;
/stansiya_1/put /put_3/status.

ACKNOWLEDGEMENT

The use of the achievements of modern system engineering makes it possible to ensure more efficient and safe management of the transport process in conditions of increasing need for rejection of electromagnetic relays. The solution of innovative tasks for the use of contactless devices in railway transport control systems will ensure an increase in transportationsafety by increasing the reliability, technical condition of devices, management.
Thus, there will be an opportunity to monitor the technical condition of all automation and telemechanics devices on the station in real time on the MQTT protocol.

REFERENCES

1.Ubaydullayev S.K Methods of microelectronic operation of the NPM-69-M block compliance scheme. Galaxy international interdisciplinary research journal (GIIRJ) Vol. 9 №12 27 dec 2021 page 1200-1204.
2.Ubaydullayev S.Q NPM-69-M blokning muvofiqlik sxemasi ishini tadqiq etish. Journal of Advanced Research and Stability. Vol. 2 isusse 01 2022 page 13-16.
3.N. Aripov, A. Sadikov, S. Ubaydullayev. Intelligent signal detectors with random moment of appearance in rail lines monitoring systems. // E3S Web of Conferences 264, 05039 (2021). CONMECHYDRO – 2021.
4.Аметова Э.К., Азизов А.Р. Теория сетей Петри при разработке и исследовании математической модели блока НСО. ФарПИ ИТЖ. 2019, №5 с.93-98.
5.Azizov A.R, Ametova E.K. NSS Mikroelektron blokini yaratish. ToshTTYMI Ahboroti. 2019 №2. 155-160 b.

6.Аметова Э.К., Азизов А.Р. Исследование модели цепи кнопочных реле микроэлектронного блока НСС. Муҳаммад ал-Хоразмий авлодлари. Муҳаммад ал-Хоразмий номидаги Тошкент ахборот технологиялари университети 2019, №3(9) 75-77 б.
7.Бестемьянов П.Ф. Методы повышения безопасности микропроцессорных систем интервального регулирования движения поездов. Докторская диссертация, Москва, 2001, 324с.
8.Goce L. Arsov The 40-th Anniversary of the Simulation Program with Integrated Circuit Emphasis – SPISE, IX Symposium Industrial Elektronics INDEL 2012, Banja Luka / L. Gose. – November 1–3. –2012. – Pp. 6–21.
9. Дж. Питерсон. Теория сетей Петри и моделирование систем: пер. с англ. / – М.: Мир, 1984. – 264 с.
10.Каменев А. Ю. Особенности применения экспериментальных методов доказательства безопасности систем микропроцессорной централизации стрелок и сигналов / А. Ю. Каменев // Информационно-управляющие системы на железнодорожном транспорте. – 2011. – № 4. – С. 104–111. – ISSN 1681-4886.
11.Касалапова Т.А., Селиверов Д.И. Релейные блоки для систем железнодорожной автоматики и телемеханики. Сборник материалов Международной научной конференции. Сер. «Молодой ученый», 2012. – С. 60-62.
12.Милинчук Ю.А., Соломатин С.К., Профатилов В. И. Бесконтактный кодовый трансмиттер/ Тезисы докладов 74-ой Международной научно-практической конференции «Проблемы и перспективы развития железнодорожного транспорта», 15-16 мая 2014 г.— Днепропетровск.
13.Xudoykulovich, Mardov Sanjar. "THE STATUS OF TEACHING THE SUBJECT" CONSTRUCTION DRAWING" IN HIGHER EDUCATION INSTITUTIONS." Archive of Conferences. 2021.
14.Mardov, S. X. (2021, November). Modern Electronic Methods of Controlling Students' Knowledge in the Field of Construction Drawing. In "ONLINE-CONFERENCES" PLATFORM (pp. 18-26)