

Collaborative Modeling for IoT

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1 Introduction

The Internet of the present day is enriched with various devices. These devices serve different purposes. Various types of sensors, actuators and devices are being developed to provide a range of services. These sensors and devices have created a new technological trend today. This trend has been named the "Internet of Things" or "Network of Things".

Internet of Things (IoT) is a concept of a network of things equipped with built-in technologies for interaction with each other or with the environment. The concept was formulated in 1999 as an understanding of the prospects for the widespread use of radio frequency identification means for the interaction of physical objects with each other and with the external environment. The Internet of Things is about installing sensors (RFID, IR, GPS, laser scanners, etc.) for everything, and connecting them to the internet through specific protocols for information exchange and communications, in order to achieve intelligent recognition, location, tracking, monitoring and management [1] [1] (<https://www.sciencedirect.com/science/article/pii/S0167739X17305253>).

IoT konsepsiyasining rivojlanishi, unga bog'liq bo'lgan yangi tadqiqot yo'nalishlariga yo'l ochdi. Shu konsepsiyalardan biri Smart city konsepsiyasi hisoblanadi.

Smart City - the concept of integrating several information and communication technologies (ICT) and the Internet of things (IoT) solutions for the management of urban property. The purpose of creating a "smart city" is to improve the quality of life with the help of computer technologies to improve the efficiency of services and meet the needs of people. ICT allows the city government to directly interact with communities and urban infrastructure, and monitor what is happening in the city, how the city is developing, and what can improve the quality of life. Through the use of sensors integrated in real time, the accumulated data from urban residents and devices are processed and analyzed.

2 Motivation

Bugungi kunda Smart city konsepsiyasi o'z ichiga bir qancha komponentlarni oladi. Ularga misol qilib Smart Grid, Smart traffic control, Smart Homes, Smart Cars, Smart factories va boshqalarni aytsa bo'ladi. Bu turdagi elementlarning

hammasi umumiy qilib “Smart X” deb nomlanadi. Smart city konsepsiyasi shaharning axborot texnologiyalardan foydalangan holda boshqarish, avtomatlashtirish, optimallashtirishga muxtoj barcha sohalarini hisobga olgan holda kelib chiqadi. Demak, Smart city turli Smart X komponentlaridan tashkil topganligi bois, uni ishlab chiqish murakkab va kompleks jarayondir va uni umumiy modellashirishda turli texnik va jamoaviy soha ekspert va mutaxassislarining birgalikda hamkorlikda ishlashini talab etadi. Masalan, Smart cityda sensorlar va aktuatorlarni loyihalash embedded system mutaxassislari tomonidan amalga oshirilishi lozim. Ushbu sensor va turli qurilmalardan keladigan ma'lumotlarni qabul qilish, yig'ish va saqlash tizim administratorlari (texnik mutaxassislar) tomonidan amalga oshirilsa, ushbu yi'g'ilgan ma'lumotlarni tahlil qilish va qayta ishlash analitiklar tomonidan amalga oshirilishi maqsadga muvofiq. IoT qurilmalari, sensorlari va aktuatorlarini to'g'ri joylashtirish masalasi ham muhim hisoblanib, u bilan qurilish loyihalashtiruvchilari shug'ullanishi lozim. Dasturiy injinerlar ushbu qurilmalarning o'zaro aloqasini ta'minlovchi va turli xizmatlar ko'rsatishi uchun mos dasturiy vositalarni ishlab chiqishadi. Bundan tashqari boshqa soha vakillari ham ushbu jarayonda ishtirok etadi. Bu mutaxassislarning birgalikda loyihalash jarayonlarini tashkillashtirish muhim ahamiyat kasb etadi.

Bu jarayonning yakuniy natijasi sifatida katta arxitektura hosil bo'ladi. Bu arxitekturani saqlash va boshqarish uchun mos injiniring metodologiyalarini qo'llash talab etiladi. Model-driven engineering (MDE) shu kabi ishlarni bajarish uchun mos fundament sifatida xizmat qilishi mumkin. Model-driven yondashuvlarini qo'llagan holda intensive hamkorlikda ishlash o'ziga xos instrument va texnikalarni talab etadi.

Ushbu jarayonda qurilgan modellarni saqlashning ham ahamiyati katta. Model yaratilishidagi bajarilgan ketma-ketliklar tarixi ham muhim ahamiyat kasb etadi. Chunki, modellashirishda ham ma'lum vaqtdan keyin ma'lum bir muddat oldingi holatga qaytish talab etiladigan vaziyatlar bo'ladi.

Bu jarayonlarning hammasi hozirgi kunda dasturiy ta'minotlarni ishlab chiqishda qo'llaniladigan jamoaviy dasturlash metodologiyalariga o'xshab ketadi. Ya'ni hozirda dasturchilar SVN, Git, Mercurial kabi tizimlarda proekt manager, koder, dizayner, testerlar birgalikda onlayn tarzida biror bir sohani dasturiy ta'minotini ishlab chiqishadi. Bunda ular o'ziga tegishli vazifani bajargan holda, uni umumiy repozitoriyaga yuklashadi. Umumiy qilingan ish repozitoriyada saqlanib boriladi. Demak, Smart X turkumidagi Smart city loyihalarini modellashirishda ham MDE va jamoaviy dasturlash metodologiyalarini qo'llash yaxshi samara berishi mumkin. But, the current state of collaborative MDE is still a long way from realizing its full potential, and the adoption in industry and IoT remains limited.

3 State of Art

4 Research Question

This is the research question section

5 Conclusion

This is conclusion section

References

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- [2] D. Kuryazov and A. Winter. Representing model differences by delta operations. In *EDOC Workshops*, pages 211–220, 2014.