

*Mannopova Maftuna G'olib qizi*  
*Alfraganus universiteti "Raqamli*  
*texnologiya" kafedrasida o'qituvchisi*  
*[m.mannapova.94@gmail.com](mailto:m.mannapova.94@gmail.com)*  
*ORCID 0000-0002-8000-4874*

## **BANKLARDAGI "CLOUD" VIRTUAL MA'LUMOTLAR MARKAZINI QURISH USULLARINI AMALGA OSHIRISH VA OPTIMALLASHTIRISH MODELLARI**

**Annotatsiya:** Ushbu maqolada banklardagi "cloud" virtual ma'lumotlar markazining xususiyatlarini hisoblash va tahlil qilish hamda bulutli ma'lumotlarga ishlov berish markazi modeli tanlangan, modellashtirilgan va ko'rib chiqilgan.

**Kalit so'zlar:** Model, optimallashtirish, simulyatsiyalash modeli, xarakteristikalar, hisoblash tugunlari, bufer sig'imi.

## **"CLOUD" VIRTUAL DATA CENTER IN BANKS MODELS FOR IMPLEMENTATION AND OPTIMIZATION OF CONSTRUCTION METHODS**

**Abstract:** In this article, the calculation and analysis of the characteristics of the "cloud" virtual data center in banks, as well as the model of the cloud data processing center are selected, modeled and reviewed.

**Keywords:** Model, optimization, simulation model, characteristics, computing nodes, buffer capacity

## **«ОБЛАЧНЫЙ» ВИРТУАЛЬНЫЙ ЦЕНТР ДАННЫХ В БАНКЕ МОДЕЛИ ВНЕДРЕНИЯ И ОПТИМИЗАЦИИ МЕТОДОВ СТРОИТЕЛЬСТВА**

**Аннотация:** В данной статье выбраны, смоделированы и рассмотрены расчет и анализ характеристик «облачного» виртуального дата-центра в банках, а также модель облачного центра обработки данных.

**Ключевые слова:** Модель, оптимизация, имитационная модель, характеристики, вычислительные узлы, буферная емкость.

### **KIRISH**

Banklarning ma'lumot almashish arxitekturalarning hajmi va masshtabi migratsiyaning yuqori narxi va ko'plab manfaatdor tomonlar o'rtasida keng konsensusga (kelishuvga) erishish qiyinligi tufayli yangi texnologiyalarni qabul qilish va joriy etishni juda qiyinlashtiradigan sharoit hisoblanadi. Banklardagi "Cloud" virtual ma'lumotlar

markazining xususiyatlarini hisoblash va agar ma'lum sharoitlarda modelning ishlashini o'rganish yoki modelning eng yaxshi natijasiga erishiladigan parametr qiymatlarini topish orqali modelning ishlashini yaxshilash kerak bo'lsa, u holda AnyLogic modelini optimallashtirish imkoniyatidan foydalanish mumkin. AnyLogic modelini optimallashtirish har xil

parametr qiymatlari bilan modelning bir nechta ishlatishlarni ketma-ket bajarish va berilgan vazifa uchun optimal parametrlar qiymatlarini topishdan iborat.

### ADABIYOTLAR TAHLILI

AnyLogic dasturida o'rnatilgan OptQuest optimallashtirgich bugungi kunda mavjud bo'lgan eng yaxshi optimallashtirgich hisoblanadi. OptQuest optimallashtirgichi berilgan cheklovlarni hisobga olgan holda eng yaxshi model parametr qiymatlarini avtomatik topadi [1]. AnyLogic optimallashtirish jarayonini sozlash va kuzatish uchun qulay grafik interfeysni taqdim etadi [2].

Optimallashtirish turli parametrlar qiymatlariga ega bo'lgan modelning bir necha ketma-ket ishlatishdan iborat. Evristika, neyron tarmoqlar va matematik optimallashtirishni kombinatsiyalash bilan OptQuest ham noaniqliklar sharoitlarida, ham cheklovlar mavjud bo'lganda maqsad funksiyasining maksimumi yoki minimumiga mos

### MUHOKAMA VA NATIJALAR

Modellar uchun optimallashtirishsiz kirish ma'lumotlari quyidagi hisoblashdan kelib chiqadi:

$$\sum_{i=1}^{\infty} [\lambda_i] < \lambda_k \quad (1)$$

So'rovlarga ishlov berish kechikish vaqtlarini minimallashtirish bo'yicha resurslarni taqsimlashni optimallashtirish usuli uchun  $\lambda_1 = 10, \lambda_2 =$

keladigan model parametrlari qiymatlarini topishga imkon beradi [3].

OptQuest optimallashtirgich OptTekSystems, Inc.ning savdo belgisi hisoblandi [4]. OptQuest bajaruvchi moduli haqida batafsil ma'lumotlarni OptTek veb-saytida (ingliz tilida) topish mumkin: [www.OptTek.com/](http://www.OptTek.com/) [5].

### TADQIQOT METODOLOGIYASI

Ilmiy maqolada ko'rsatilgan har bir davlatda o'z talablariga asoslangan o'ziga xos qonun va qoidalar mavjud. Shu sababli har bir bankdagi "cloud" virtual ma'lumotlar markazi xususiyatlarini hisoblash va tahlil qilish qo'llanilishi ilgari suradi. Hozirgi kunda ko'plab rivojlanib borayotgan moliyaviy firmalar axborot tizimlari va texnologiyalari kuchli raqobatdaligini ko'rish mumkin. Model, optimallashtirish, simulyatsiyalash modeli, xarakteristikalar, hisoblash tugunlari, bufer sig'imi va boshqa texnologiyalardan ham foydalanilgan, mualliflar tomonidan xulosa va takliflar berilgan.

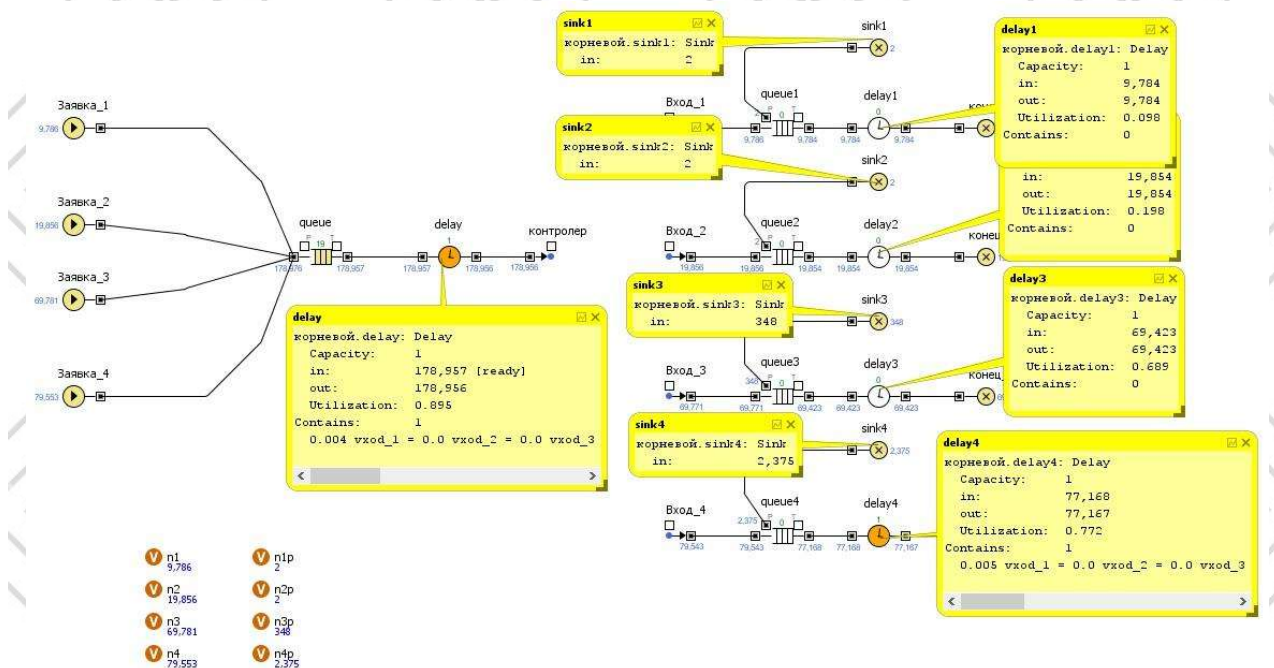
bu yerda  
 $\lambda_i$  – i-tugunlarda tushgan so'rovlarning intensivligi;  
 $\lambda_k$  – kontrollerga tushgan so'rovlarning intensivligi;  
 $V_{vch}$  – i-virtual mashinaning hisoblash resurslari;  
*i* – tarmoq tugunlari soni

20,  $\lambda_3 = 30, \lambda_4 = 40, \lambda_k = 200$  va  $V_{h1} = V_{h2} = V_{h3} = V_{h4} = 100$  bo'lsa, 1-jadvalda keltirilgan qiymatlarni olamiz.

1-jadval

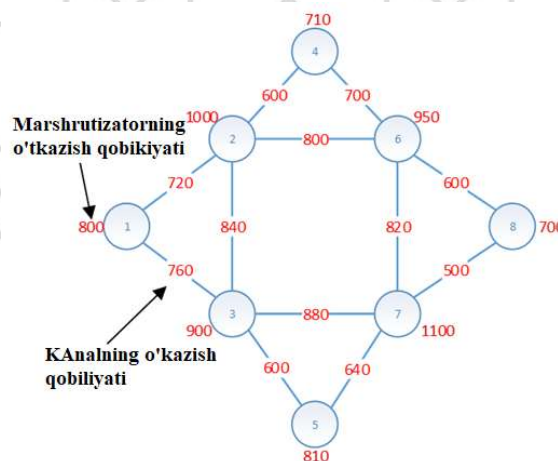
Simulyatsiyalash modeli xarakteristikalarini hisoblash

Nomi	Yuklanish (Util)	Navbat uzunligi (L)
Kontroller	0,895	
1-hisoblash tuguni	0,098	2
2-hisoblash tuguni	0,198	2
3-hisoblash tuguni	0,689	348
4-hisoblash tuguni	0,772	2,375



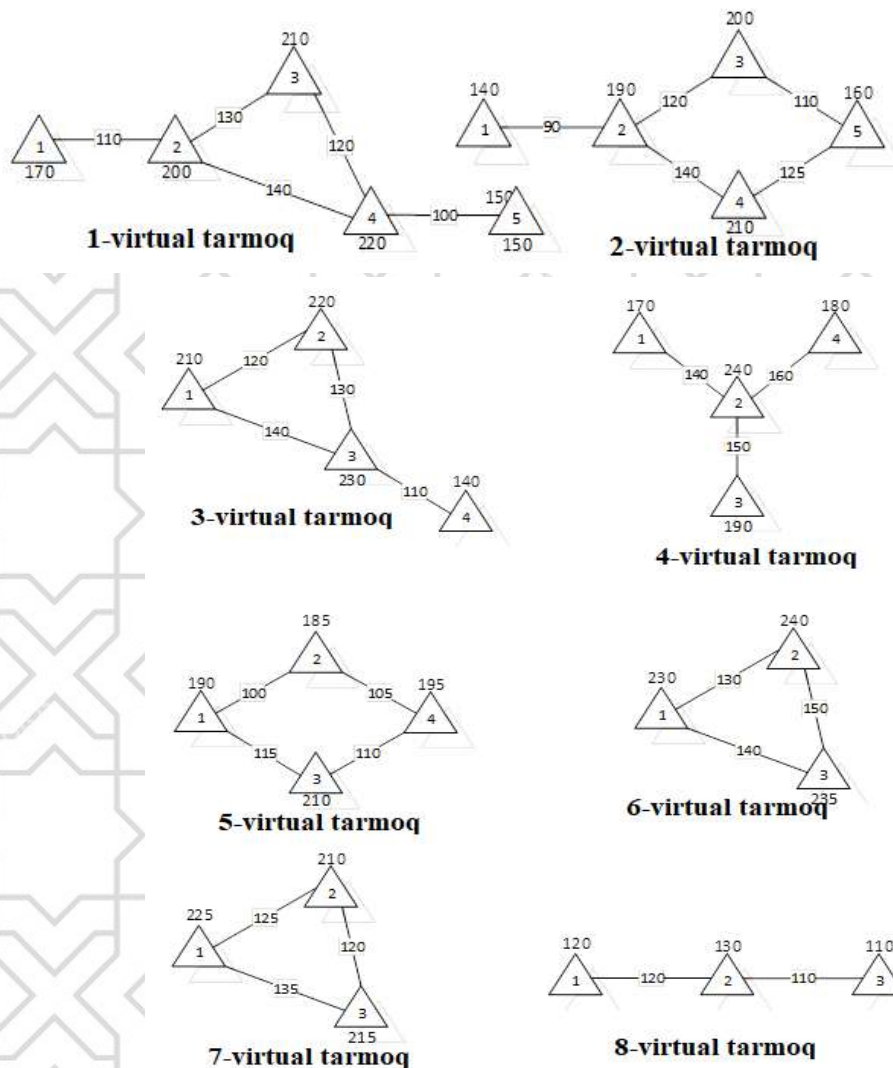
1-rasm. Optimallashtirishsiz olingan natijalar

Ko'rib chiqilgan virtual parametrlarni sonli baholash va tarmoqlarni qurish usullari asosida taqqoslash natijalariga ega bo'lgan bu quyida 1-rasmدا keltirilgan fizik tarmoq varianti uchun foydalaniladigan usullarni amalga oshirishga misollar keltirilgan



2-rasm. Fizik tarmoq

Qurishga misollarni ko'rib chiqishda 8 ta virtual tarmoq qurilishi kerak bo'lgan fizik tarmoq ishlatilgan (3-rasm).

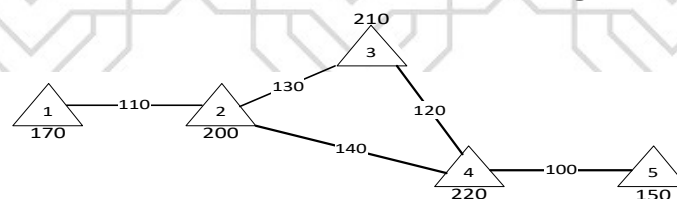


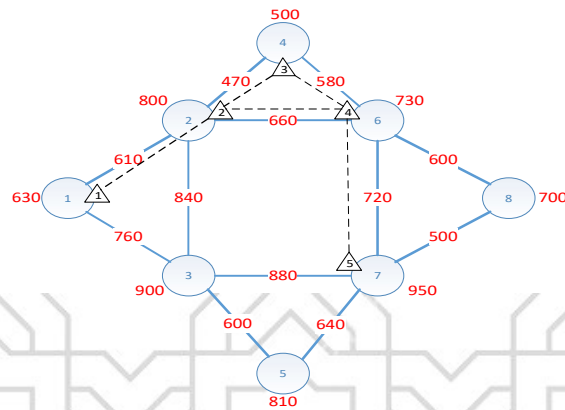
**3-rasm. Virtual tarmoqlar**

Oldingi bobda ko'rsatilgan barcha usullarni batafsilroq ko'rib chiqish uchun marshrutizatorlarning bog'langanligi, shuningdek, barcha virtual tarmoqlarni qurish usullarini

to'liq amalga oshirish uchun uncha katta bo'lmagan o'tkazish qobiliyatiga ega bo'lgan ma'lum fizik tarmoq olingan.

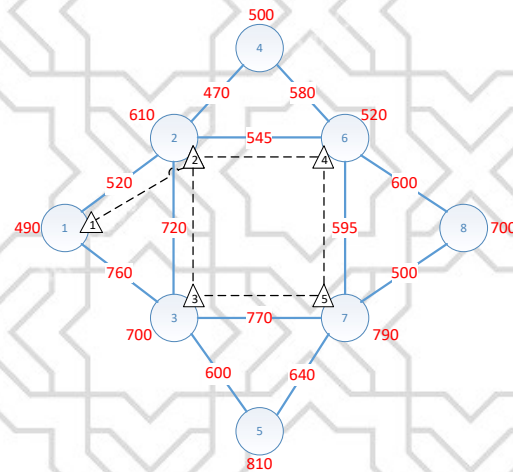
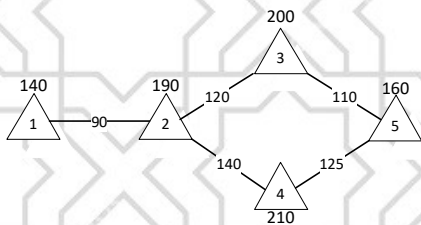
**Variantlarni saralash usuli asosidagi misol**





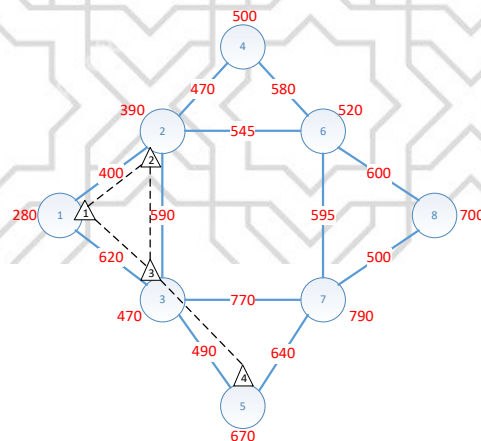
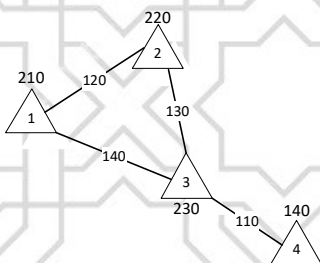
**4-rasm. №1-virtual tarmoqni fizik tarmoqqa qurish**

№1-virtual tarmoqni qurishda barcha marshrutizatorlar uchun o'tkazildi, shundan so'ng virtual tarmoqni qurish uchun eng maqbul variant tanlandi.



**5-rasm. №2-virtual tarmoqni fizik tarmoqqa qurish**

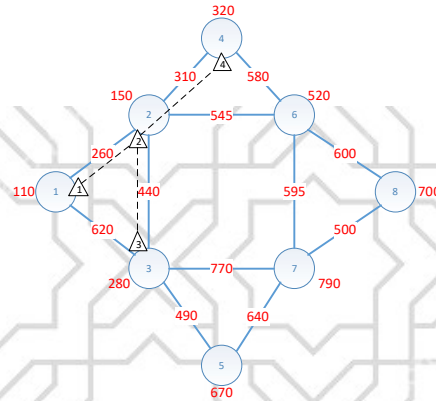
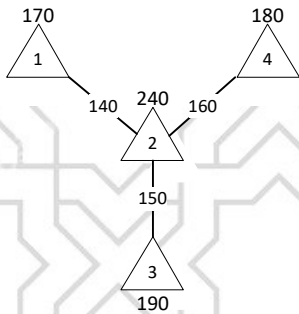
№2-virtual tarmoqni qurishda barcha marshrutizatorlar uchun o'tkazildi, shundan so'ng virtual tarmoqni qurish uchun eng maqbul variant tanlandi.



**6-rasm. №3-virtual tarmoqni fizik tarmoqqa qurish**

№3-virtual tarmoqni qurishda barcha marshrutizatorlar uchun tahlil o'tkazildi, shundan so'ng virtual

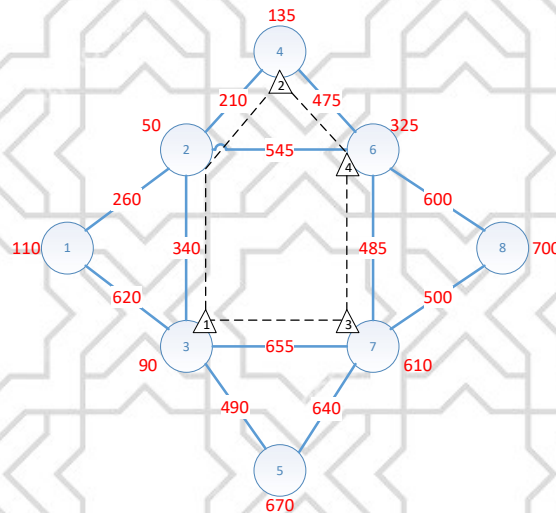
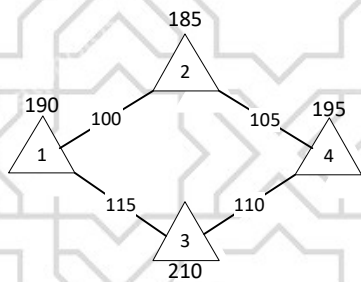
tarmoqni qurish uchun eng maqbul variant tanlandi



**7-rasm. №4-virtual tarmoqni fizik tarmoqqa qurish**

№4-virtual tarmoqni qurishda barcha marshrutizatorlar uchun tahlil o'tkazildi, shundan so'ng virtual

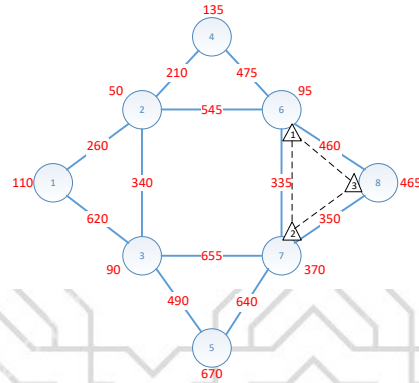
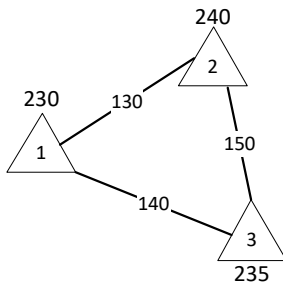
tarmoqni qurish uchun eng maqbul variant tanlandi.



**8-rasm. №5-virtual tarmoqni fizik tarmoqqa qurish**

№5-virtual tarmoqni qurishda barcha marshrutizatorlar uchun tahlil o'tkazildi, shundan so'ng virtual

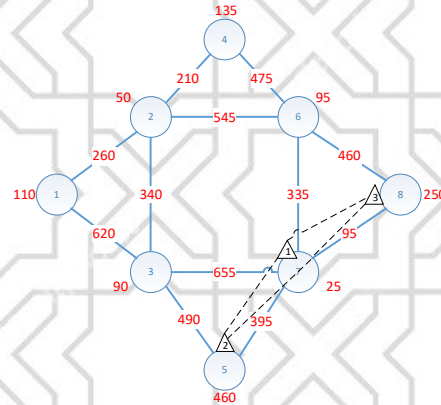
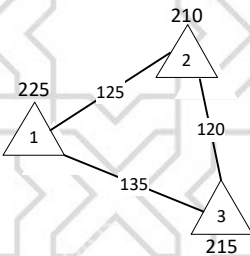
tarmoqni qurish uchun eng maqbul variant tanlandi



**9-rasm. №6-virtual tarmoqni fizik tarmoqqa qurish**

№6-virtual tarmoqni qurishda barcha marshrutizatorlar uchun tahlil o'tkazildi, shundan so'ng virtual

tarmoqni qurish uchun eng maqbul variant tanlandi.



**10-rasm. №7-virtual tarmoqni fizik tarmoqqa qurish**

№7-virtual tarmoqni qurishda barcha marshrutizatorlar uchun tahlil o'tkazildi, shundan so'ng virtual tarmoqni qurish uchun eng maqbul variant tanlandi.

tajribalar asosida aniqlandi. Virtual xizmat ko'rsatish tarmoq ma'lumotlarga ishlov berish markazlarining asosiy xarakteristikalari optimallashtirmasdan o'tkazilgan tajribalar asosida aniqlandi. Olingan ma'lumotlar tegishli jadvallarda qayd etilgan, jadvallardagi ma'lumotlarni tasdiqlaydigan rasmlar ham ilova qilingan.

**XULOSA VA TAKLIFLAR**

Ushbu maqolada bulutli ma'lumotlarga ishlov berish markazlarining asosiy xarakteristikalari optimallashtirmasdan o'tkazilgan

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