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of the MMIT'25 International Conference

TA'LIMNING ZAMONAVIY USULLARI VA
INNOVATSION TEXNOLOGIYALAR

MODERN METHODS AND INNOVATION
TECHNOLOGIES IN EDUCATION

СОВРЕМЕННЫЕ МЕТОДЫ И
ИННОВАЦИОННЫЕ ТЕХНОЛОГИИ
В ОБРАЗОВАНИИ

29 May 2025, Tashkent, Uzbekistan

MAQOLALAR TO'PLAMI
СБОРНИК СТАТЕЙ



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Modern methods and innovation technologies in education

**Современные методы и инновационные технологии в
образовании**

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PROTOKOLLAR YORDAMIDA VPN TARMOQNING XAVFSIZLIGINI TA'MINLASH

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Annotatsiya. VPN ulanishlardan foydalanishda xavfsizlikni ta'minlashning asosiy texnologiyalariga e'tibor qaratiladi. Asosiy VPN protokollari Nuqta-nuqta tunnellashtirish protokoli (PPTP), Himoyalangan soket tunnellashtirish protokoli (SSTP), Ikkinchi darajali tunnel protokoli (L2TP), OpenVPN, Internet Key Exchange 2-versiyasi (IKEv2) va IPSec ko'rib chiqiladi va tahlil qilinadi. VPN xavfsizlik funksiyalariga ham e'tibor qaratiladi.

Kalit so'zlar: VPN; virtual xususiy tarmoq; xavfsizlik; bog'lanish; protokollar; shifrlash.

VPN NETWORK SECURITY WITH PROTOCOLS

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Abstract .When using VPN connections, attention is paid to the basic security technologies. Basic VPN protocols Point-to-Point Tunneling Protocol (PPTP), Secure Socket Tunneling Protocol (SSTP), Second-Level Tunneling Protocol (L2TP), OpenVPN, Internet Key Exchange Version 2 (IKEv2), and IPSec are reviewed and analyzed. Attention is also paid to VPN security features.

Keywords: VPN; virtual private network; security; connection; protocols; encryption.

Kirish

Zamonaviy tarmoq texnologiyalarining rivojlanishi bilan samarali, xavfsiz va bir vaqtning o'zida kengaytiriladigan ma'lumotlar uzatish tarmog'iga bo'lgan talab ham rivojlanmoqda. Bunday tarmoqlarni tashkil etish uchun Virtual Private Network (VPN) texnologiyasini, ya'ni virtual xususiy tarmoqni qo'llash qabul qilingan. VPN texnologiyasi bir-biridan jismonan uzoqda joylashgan tugunlarni lokal tarmoq orqali bir-biri bilan bog'lanishini ta'minlash imkonini beradi. Lokal tarmoq bu holda Internet tarmog'i ustida ta'minlanadi.

Virtual xususiy tarmoq (VPN) xususiy tarmoqni umumiy tarmoq bo'ylab kengaytiradi va foydalanuvchilarga umumiy tarmoqlar orqali ma'lumotlarni yuborish va olish imkonini beradi, go'yo ularning hisoblash manevrlari to'g'ridan-to'g'ri yopiq tizim bilan bog'liq. Shu sababli, VPN orqali ishlaydigan ilovalar xususiy tarmoqning funksionalligi, xavfsizligi va boshqaruvidan foydalanishi mumkin [1].

VPNning maqsadi mavjud umumiy foydalanish tarmog'i Internet orqali kompyuter tarmoqlari o'rtasida xavfsiz va ishonchli ulanishni ta'minlashdir. Shu bilan birga, VPN har doim quyidagilarni talab qiladi: Xavfsizlik, ishonchlilik, masshtablanuvchanlik [2].

Xavfsizlikni ta'minlash

VPN-ulanishdan foydalanib, butun trafikni dunyoning boshqa joyida joylashgan server orqali xavfsiz yo'naltirish mumkin. Bu mahalliy kuzatish va buzish urinishlaridan himoya qiladi va hatto murojaat qilingan veb-saytlar va xizmatlardan Internet protokolining haqiqiy manzilini yashiradi.

VPN xususiy tarmoqni kengaytirish yoki shakllantirish uchun IP protokoli xavfsizligi (IPsec), transport darajasi xavfsizligi (SSL/TLS), ma'lumotlar transport darajasi xavfsizligi

(DTLS), umumiy foydalanish tarmoqlari orqali qurilmalar yoki tarmoqlarni xavfsiz ulash kabi ko'plab texnologiyalardan birini qo'llashi mumkin.

Xavflarni bartaraf etish uchun VPN mahsulotini tanlashda qo'shimcha VPN xavfsizlik funksiyalarini hisobga olish kerak. Bularga majburiy xavfsizlik funksiyalari kiradi:

- Ishonchli autentifikatsiyani dastaklash.
- Shifrlashning ishonchli algoritmlari.
- Antivirus dasturiy ta'minoti hamda hujumlarni aniqlash va oldini olish vositalaridan foydalanish.
- Boshqaruv va xizmat ko'rsatish portlari uchun ishonchli standart himoya.
- Raqamli sertifikatni qo'llab-quvvatlash.
- Ro'yxatga olish va auditni qo'llab-quvvatlash.
- Xususi tarmoqdagi mijozlarga manzillarni tayinlash imkoniyati, bunda barcha manzillar yopiqlicha qoladi.

VPN xavfsizligini oshirishning yana bir usuli - bu mukammal to'g'ridan-to'g'ri maxfiylik (PFS). Agar PFS ishlatilsa, shifrlangan xabarlar va ilgari yozilgan seanslar uzoq muddatli maxfiy kalitlar yoki parollar buzilgan bo'lsa, olinmaydi va deshifrlanmaydi [2].

VPN protokollari

VPN tunnellar protokollari turli xil funksiyalar va xavfsizlik darajalarini taklif qiladi va ularning har biri uchun afzalliklar va kamchiliklar mavjud. VPN tunnellashtirishning oltita asosiy protokollari mavjud: Nuqta-nuqta tunnellashtirish protokoli (PPTP), Himoyalangan socket tunnellashtirish protokoli (SSTP), Ikkinchi darajali tunnel protokoli (L2TP), OpenVPN, Internet Key Exchange 2-versiyasi (IKEv2) va IPsec [2].

PPTP ko'p protokollari trafikni shifrlash va keyin uni IP protokoli tarmog'i orqali yuboriladigan sarlavhaga o'rash imkonini beradi. PPTP masofadan kirish va "nuqta-nuqta" VPN ulanishlari uchun ishlatilishi mumkin. Internetdan foydalanilganda, PPTP serveri Internetda bitta interfeysga va korporativ intratarmoqda ikkinchi interfeysga ega bo'lgan PPTPni qo'llab-quvvatlaydigan VPN serveri hisoblanadi [3],[5].

SSTP boshqa protokollarni bloklashi mumkin bo'lgan brandmauerlar va veb-proksilar orqali trafikni uzatish uchun HTTPS protokolidan foydalanadi. SSTP "nuqta-nuqta" (PPP) protokoli trafiginin SSL kanali orqali o'tkazish mexanizmini taqdim etadi [2].

L2TP 2-qatlam tunnellar protokoli VPN uchun tunnellar protokoli va standart marshrutizatorlar orasidagi yoki mijozlardan xostlargacha bo'lgan tunnellar Internet-provayder (ISP) orqali Nuqtama-nuqta tarmoqdan foydalanish serveri (NAS). L2TP portda UDP protokolidan foydalanadi biroq L2TP tarkibiga quyidagilar kirmaydi paketlarni shifrlash protokoli, shuning uchun u boshqa protokolni talab qiladi [4, 5].

OpenVPN - bu ochiq kodli dasturiy ta'minot bo'lib, yo'naltirilgan yoki ko'priqli konfiguratsiyalarda va masofaviy kirish vositalarida xavfsiz "nuqta-nuqta" yoki "sayt" ulanishlarini yaratish uchun VPN usullarini amalga oshiradi. U kalitlarni almashish uchun SSL/TLS dan foydalanadigan shaxsiy xavfsizlik protokolidan foydalanadi [2].

IKEv2 - bu Windows 7 va undan yuqori versiyalarda ishlatiladigan IPsec protokoliga asoslangan protokoldir. IKEv2 - bu bir xil darajadagi VPN qurilmalari o'rtasida xavfsiz kalit almashish uchun keyingi avlod standarti. IKEv2, ayniqsa, foydalanuvchilar internet aloqasini vaqtincha yo'qotganda VPN aloqasini avtomatik tiklashda juda qo'l keladi [2].

IPsec tarmoq qatlami xavfsizligini ta'minlaydi, jumladan, kirish nazorati, ma'lumotlar yaxlitligi, autentifikatsiya, takroriy hujumlardan himoya va maxfiylik. IP uchun xavfsizlik protokollari IPsec tomonidan taqdim etilgan datagrammalar quyidagilardir: Autentifikatsiya sarlavhasi va xavfsizlik yukini (ESP) inkapsulyatsiya qilish [4, 5].

Umuman olganda ushbu protokollar trafikni shifrlash, protokollarni bloklash, marshrutizatorlar orasidagi tarmoqdan foydalanish, masofaviy kirish vositalarida xavfsiz ulanishlarini yaratish, xavfsiz kalit almashish, ma'lumotlar yaxlitligi, tarmoq qatlami xavfsizligini ta'minlash imkoniyatlariga ega.

Xulosa

VPN ulanishlardan foydalanishda xavfsizlikni ta'minlashning asosiy texnologiyalari o'rganildi. Protokollar trafikni shifrlash, protokollarni bloklash, marshrutizatorlar orasidagi tarmoqdan foydalanish, masofaviy kirish vositalarida xavfsiz ulanishlarini yaratish, xavfsiz kalit almashish, ma'lumotlar yaxlitligi, tarmoq qatlami xavfsizligini ta'minlash imkonini beruvchi asosiy VPN protokollari Nuqta-nuqta tunnellashtirish protokoli (PPTP), Himoyalangan socket tunnellashtirish protokoli (SSTP), Ikkinchi darajali tunnel protokoli (L2TP), OpenVPN, Internet Key Exchange 2-versiyasi (IKEv2) va IPSec ko'rib chiqildi va tahlil qilindi.

Adabiyotlar ro'yxati

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An abstract graphic featuring a complex network of interconnected nodes and lines, resembling a molecular structure or a digital network, set against a dark blue background. The nodes are represented by circles of varying sizes, and the lines are thin, light blue, creating a web-like pattern that spans the upper two-thirds of the page.

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