



MAMLAKA YA MAWASILIANO TANZANIA

Muongozo Kuhusu Viashiria Muhimu vya Utendaji wa Mitambo Inayotoa Huduma za Mtandao

UMETOLEWA NA TCRA – JULAI 2024



MUONGOZO KUHUSU VIASHIRIA MUHIMU VYA UTENDAJI WA MITAMBO INAYOTOA HUDUMA ZA MTANDAO

Hati Namba: TCRA/DIA/TIM/GUD-CNE/002

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SEHEMU YA KWANZA MASHARTI YA UTANGULIZI

1.0 Nukuu

Muongozo huu utanukuliwa kama Muongozo kuhusu viashiria muhimu vya utendaji wa mitambo inayotoa huduma za mtandao, 2024.

2.0 Matumizi

Muongozo huu unatumika kwa watoa huduma wa mitandao ya simu wanaotoa huduma za mawasiliano ya sauti, intaneti and jumbe fupi (SMS) pamoja na watoa huduma wanaotoa huduma za intaneti nchini Tanzania.

3.0 Malengo

Malengo ya muongozo huu ni kuhakikisha wateja wanapata huduma za mawasiliano kupitia miundombinu mbalimbali iliyowekwa na watoa huduma.

3.1 Malengo Mahususi

Malengo mahususi ya muongozo huu yanajumuisha: -

- i. Kuhakikisha watoa huduma za mawasiliano wanatoa huduma za uhakika;
- ii. Kupata tathmini ya viashiria muhimu vya utendaji wa mitambo inayotoa huduma za mtandao; na
- iii. Kuwezesha watoa huduma kutoa na kudumisha kiwango cha ubora wa huduma kinachokubalika licha ya changamoto mbalimbali katika uendeshaji wa mitambo ya mtandao na hivyo kupunguza athari za kushindwa kupata huduma ya mawasiliano kutokana na hitilafu kwenye mtandao.

4.0 Tafsiri

Katika Muongozo huu, isipokuwa kama muktadha utahitaji vinginevyo: -

“Core Router/Switch” means a router or switch to which a Core Network (CN) element is connected;

“Diameter Routing Agent” means a functional element for routing Diameter signaling to several network elements;

“Dirisha la Matengenezo” maana yake ni kipindi kati ya saa sita usiku hadi saa kumi alfajiri ambapo matengenezo yaliyopangwa yanafanyika;

“ENUM” means a network element which enables translation of E.164 numbers to SIP URIs (Session Initiation Protocol Uniform Resource Identifiers) using DNS (Domain Name System) to enable message routing of IMS sessions;

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“Gateway GPRS Support Node” means a network element which connects a 2G or 3G mobile user to external Packet Data Networks;

“Hitilafu kubwa” (Critical Outage) maana yake ni hitilafu kubwa zinazosababisha kukosekana kwa huduma inayoweza kusababisha uharibifu mkubwa au kupotea kabisa kwa huduma, kuathiri idadi kubwa ya watumiaji au eneo la kijiografia na kudumu kwa muda unaozidi dakika kumi na tano;

“Home Location Register” means a master database for a given 2G or 3G user containing the subscription-related information to support the network entities handling calls/sessions;

“Home Subscriber Server” means a master database that contains subscriber profiles for LTE and IMS subscribers. It supports authentication, authorization and mobility management functions;

“Interrogating Call Session Control Function” means a session controller responsible for onward routing of SIP messages to the appropriate S-CSCF (Serving CSCF) for a given VoLTE subscriber;

“Leseni ya rasilimali za mtandao” (Capacity License) maana yake ni leseni inayowekwa kwenye mitambo ya mawasiliano ili kuruhusu matumizi ya kiasi fulani cha rasilimali za mtandao;

“Mamlaka” maana yake ni Mamlaka ya Usimamizi wa Mawasiliano iliyoanzishwa chini ya Sheria ya Mamlaka ya Udhhibiti wa Mawasiliano Tanzania namba 12 ya mwaka 2003;

“Matengenezo yaliyopangwa” maana yake ni matengenezo yaliyopangwa kwa lengo la kuboresha rasilimali zilizopo za mtandao;

“Media Gateway” means a circuit-switched core network element that is controlled by the mobile switching server (MSS) to terminate bearer channels from a circuit-switched network and media streams from a packet network;

“Mfumo wa malipo” (Charging System) maana yake ni mfumo wa kukusanya gharama za matumizi ya huduma za mawasiliano mtandaoni wakati mteja anatumia huduma au baada ya matumizi ya huduma;

“Mfumo wa malipo nje ya mtandao” (Offline Charging System) maana yake ni mfumo unaofanya udhibiti wa huduma za mawasiliano baada ya matumizi, mfumo unakusanya na kuchakata nje ya mtandao taarifa za matumizi (CDRs) za mteja kwa madhumuni ya kutoza gharama za mawasiliano;

“Mfumo wa malipo wa mtandaoni” (Online Charging system) maana yake ni mfumo unaofanya udhibiti wa huduma za mawasiliano wakati wa matumizi, ikiwemo usimamizi wa miamala, upimaji wa gharama za mawasiliano, usimamizi wa akaunti na salio la mteja;

“Mobility Management Entity” means a key control network element for the LTE network responsible for mobility management and bearer establishment and authentication (in conjunction with the HSS);

“Mobile Switching Centre Server” means a circuit-switched (CS) core network element that handles all call control and mobility functions. As such, it is responsible for the control of mobile-originated and mobile-terminated circuit-switched domain calls. It also contains the VLR database that stores subscriber data. The MSS also performs connection control for media channels in a CS Media Gateway;

“Mtambo wa uthibitishaji” (Authentication Centre) maana yake ni mtambo wa mawasiliano unaotumika kuhifadhi taarifa muhimu za usalama za mteja ili kumthibitisha mteja wakati anajiunga na mtandao ili kupata huduma;

“Mtoa huduma” maana yake ni mtu aliyepewa leseni na Mamlaka ya kutoa huduma za mawasiliano nchini Tanzania;

“Mtambo wa Jumbe fupi za maandishi” maana yake ni mtambo wa mtandao unaohifadhi, kutuma na kupokea jumbe fupi (SMS) kutoka kwa watumiaji wa mtandao wa simu;

“Muda wenye shughuli nyingi za mawasiliano” (Busy Hour) maana yake ni dakika 60 katika siku ambapo mtandao wa mawasiliano unakuwa na trafiki kubwa za mawasiliano;

“Packet Data Network Gateway” means a network element that provides connectivity between the user equipment (UE) and external packet data networks. It provides the entry and exit point of traffic for the UE;

“Policy Charging and Rules Function - PCRF” means a network element that provides policy control decisions and flow-based charging controls. The PCRF determines how a service data flow will be treated in the enforcement function and ensures that the user plane traffic mapping and treatment is in accordance with the user profiles;

“Proxy Call Session Control Function” means a SIP proxy that is the first point of contact for session signaling for the IMS-enabled VoLTE UE;

“Rejista ya utambuzi wa vifaa” (Equipment Identification Register) maana yake ni kanzidata ya kielektroniki inayohifadhi namba tambulishi (IMEI or ESN) za vifaa vya mawasiliano;

“Session Border Controller” means a device deployed by service providers to control SIP sessions and media resources for VoIP calls. It is used to hide the internal network topology of the service provider when connecting to external networks;

“Serving Call Session Control Function” means a session controller that provides session set-up, session tear-down, session control and routing functions;

“Serving Gateway” routes and forwards user data packets, while also acting as the mobility anchor for the user plane during inter-eNodeB handovers and as the anchor for mobility between LTE and other 3GPP technologies;

“Serving GPRS Support Node” means a network element responsible for the delivery of data packets from and to the mobile stations within its geographical service area. Its tasks include

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packet routing and transfer, mobility management (attach/detach and location management), logical link management, and authentication functions;

“Signaling Transfer Point” means a network element responsible for transfers of SS7 messages between interconnected nodes (signaling endpoints) based on information contained in the SS7 address fields;

“Telephony Application Server” means an IMS Application Server providing support for a minimum set of mandatory Multi-Media Telephony (MMTel) services; na

“Unstructured Supplementary Services Data Gateway” means a platform responsible for handling USSD sessions between a subscriber and a particular service application.

SEHEMU YA PILI

VIASHIRIA VYA UTENDAJI

5.0 Viashiria vya Utendaji wa Mitambo inayotoa huduma za Mtandao

Mtoa huduma atahakikisha mitambo inayotoa huduma za mtandao inapatikana kwa angalau asilimia 99.99% (bila kujumuisha matengenezo yaliyopangwa). Mahitaji ya chini ya viashiria vya utendaji wa mitambo inayotoa huduma za mtandao itakuwa kama ifuatavyo: -

5.1 MSS

Performance Indicator	Requirements
Redundancy	The MSSs may be configured in an MSS POOL as specified in 3GPP TS 23.236
BHCA utilization	The BHCA utilization of the MSS need not to exceed 80%
VLR capacity utilization	The VLR database need not to exceed 80% utilization
Average CPU load	The average CPU load of computer units need not to exceed 80%
Memory usage	The memory usage for all computer units needs to be below 90%
Capacity License utilization	The utilization of all capacity licenses need not to exceed 80%
Disk Utilization	The disk utilization need not to exceed 90%
MSRN utilization	The utilization of the MSRN pool need not to exceed 90%

5.2 MGW

Performance Indicator	Requirements
Redundancy	In case the NNSF function is in the MGW, the MGWs may be clustered as per RFC 4666
BHCA utilization	< 80%

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Average CPU load	The average CPU load of signaling units and media processing units need not exceed 80% and 85%, respectively
Memory usage	< 90%
Capacity License utilization	< 80%
SS7 average link load	The average link load of SS7 links need not exceed 0.2 Erlangs (40%) during off-peak hours and 0.4 Erlangs (80%) during busy hours
H.248/GCP context reservation success rate	> 99%
Disk utilization	< 80%

5.3 HLR, HSS, AuC & EIR

A layered architecture for the deployment of these core network elements is recommended. Mitambo inayotoa huduma za mtandao itakidhi viashiria vya utendaji vifuatavyo;

Performance Indicator	Requirements
FE Redundancy	$\geq N+1$
Centralized DB redundancy	$\geq 2N$
Average CPU load	< 80%
Memory usage	< 90%
Capacity License utilization	< 80%
Disk Utilization	< 80%
Response time	< 100 ms

5.4 SMSC

Performance Indicator	Requirements
Redundancy	$\geq 2N$ or $N+1$
Average CPU load	< 80%
Memory usage	< 90%
Capacity License utilization	< 80%
Busy Hour utilization	< 80%
Disk Utilization	< 80%

5.5 STP & DRA

Performance Indicator	Requirements
Redundancy	$\geq 2N$ or $N+1$
Average CPU load	< 80% for MSU and Diameter processors
Memory usage	< 90%
Capacity License utilization	< 80%
Busy Hour utilization	< 80%
Disk Utilization	< 80%

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5.6 SBC/P-CSCF

Performance Indicator	Requirements
Redundancy	$\geq 2N$ or $N+1$
Average CPU load	$< 80\%$
Memory usage	$< 90\%$
Capacity License utilization	$< 80\%$
Busy Hour session utilization	$< 80\%$
Disk Utilization	$< 80\%$
RTP packet loss	$< 1\%$ as per 3GPP TS 23.203

5.7 SGSN & MME

Mitambo ya SGSN na MME inakuwa kwenye mtambo mmoja na utakuwa na viashiria vya utendaji kama ifuatavyo: -

Performance Indicator	Requirements
Redundancy	$\geq 2N$ or $N+1$ or SGSN/MME POOL as per 3GPP TS 23.236 and 3GPP TS 23.401
Average CPU load	$< 80\%$
Memory Utilization	$< 90\%$
Attached subscriber capacity	$< 90\%$
Maximum active PDP context or EPS bearer contexts	$< 80\%$
Disk Utilization	$< 80\%$
GN Interface Utilization	$< 80\%$

5.8 GGSN, P-GW & S-GW

Mitambo ya GGSN, P-GW na S-GW inakuwa kwenye mtambo mmoja na utakuwa na viashiria vya utendaji kama ifuatavyo: -

Performance Indicator	Requirements
Redundancy	$\geq 2N$ or $N+1$
Average CPU load	$< 80\%$
PDP context resources or EPS bearer context usage	$< 80\%$
Disk Utilization	$< 80\%$
Gi Interface Utilization	$< 80\%$

5.9 PCRF

Performance Indicator	Requirements
Redundancy	$\geq 2N$ or $N+1$
Peak Hour TPS (Throughput)	$< 80\%$

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Average CPU load	< 80%
Memory Utilization	< 90%
Disk Utilization	< 85%

5.10 CHARGING SYSTEM

Performance Indicator	Requirements
Redundancy	2N
Busy-Hour Utilization	< 80%
Average CPU load	< 80%
Memory Utilization for rating and charging nodes	< 90%
Capacity License Utilization	< 80%
Disk Utilization for rating and charging nodes	< 80%
Response Time for rating and charging nodes	< 100 ms for busy hour period

5.11 S-CSCF/I-CSCF

Performance Indicator	Requirements
Redundancy	$\geq 2N$ or $N+1$
Busy Hour Session Utilization	< 80%
Average CPU load	< 80%
Memory Utilization	< 90%
Disk Utilization	< 80%

5.12 TAS

Performance Indicator	Requirements
Redundancy	$\geq 2N$ or $N+1$
Busy Hour Utilization	< 80%
Average CPU load	< 80%
Memory Utilization	< 90%
Disk Utilization	< 85%

5.13 ENUM/DNS

Performance Indicator	Requirements
Redundancy	$\geq 2N$ or $N+1$
Busy Hour Query Throughput	< 90%
Average CPU load	< 80%
Memory Utilization	< 90%
Query Response Time	< 100 ms
Disk Utilization	< 85%

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5.14 USSD GW

Performance Indicator	Requirements
Redundancy	$\geq 2N$ or $N+1$
Busy Hour Query Throughput	$< 80\%$
Average CPU load	$< 80\%$
Memory Utilization	$< 90\%$
Query Response Time	< 100 ms
Disk Utilization	$< 85\%$

5.15 CORE ROUTERS/SWITCHES

Performance Indicator	Requirements
Redundancy	$\geq 2N$
Interface availability	$> 99.95\%$
Interface usage	$< 80\%$
Average CPU load	$< 80\%$
Memory Utilization	$< 90\%$
Packet Loss	$< 1\%$

5.16 MOBILE MONEY PLATFORM

Parameter	Requirements
Redundancy	$\geq 2N$
Average CPU load	$< 80\%$
Memory Utilization	$< 90\%$
Response time	< 100 ms
Busy hour throughput	$< 80\%$

SEHEMU YA TATU

MASHARTI YA MATENGENEZO

6.0 Matengenezo ya Kinga

Matengenezo ya kinga yatahusu matengenezo yote ya kawaida ya mitambo inayotoa huduma za mtandao ili kuzuia kukosekana kwa huduma kusikotarajiwa kutokana na hitilafu. Mtoa huduma atafanya yafuatayo: -

- kufanya ukaguzi wa utendaji wa mitambo inayotoa huduma za mtandao kila siku;
- kufanya matengenezo ya kinga mara kwa mara bila kuathiri utendaji wa mitambo inayotoa huduma za mtandao;
- kufanya usimamizi na ufuatiliaji wa mitambo yote inayotoa huduma za mtandao ili kugundua hitilafu au kasoro; na
- kuchukua nakala ya taarifa za mfumo wa mawasiliano na kuhifadhi nakala hiyo nje ya mtambo wa mtandao.

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7.0 Hitilafu

Taratibu zifuatazo zinatumiwa katika kuzuia kukosekana kwa huduma kusikotarajiwa kutokana na hitilafu kubwa za mitambo inayotoa huduma za mtandao: -

7.1 Hitilafu zinazotokana na matengenezo yaliyopangwa

Mtoa huduma atazingatia yafuatayo endapo matengenezo yaliyopangwa yanatarajiwa kusababisha kukosekana kwa huduma: -

- i. kutoa notisi mapema kwa wateja angalau saa 48 kabla ya kufanya matengenezo;
- ii. kufanya matengenezo ndani ya muda uliopangwa kwa ajili matengenezo;
- iii. kutoa taarifa kwa Mamlaka kwa maandishi angalau saa 72 kabla yakufanya matengenezo yaliyopangwa: na
- iv. kutoa taarifa kuhusu huduma na maeneo yatakayoathirika, athari zake na muda unaotarajiwa kurejesha huduma.

7.2 Hitilafu kubwa

Mtoa huduma atawajibika kufanya yafuatayo wakati wa hitilafu kubwa: -

- i. kutoa taarifa kwa Mamlaka ndani ya saa tatu (3) tangu kutokea kwa hitilafu, akielezea huduma iliyoathirika, maeneo na idadi ya wateja walioathirika, athari na muda unaotarajiwa kurejesha huduma;
- ii. kutoa taarifa kwa wateja walioathirika baada ya kurejesha huduma;
- iii. kutoa taarifa kwa Mamlaka kila baada ya saa tatu (3) kuhusu maendeleo ya kurekebisha hitilafu; na
- iv. kuwasilisha taarifa kwa Mamlaka ndani ya saa 48 baada ya kurejesha huduma ikieleza kuhusu chanzo cha hitilafu, athari zilizotokea, hatua zilizochukuliwa kurejesha huduma, na hatua zitakazochukuliwa ili kuzuia tukio hilo lisitokee tena.

8.0 Marekebisho

Muongozo huu unaweza kufanywa mapitio ya mara kwa mara na Mamlaka kadiri itakavyoona inafaa.

Wasiliana nasi:

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