Documentation

Introduction  
  
The DMAT (Device Monitoring and Analysis Tool) is a comprehensive solution designed to provide real-time monitoring and analysis for Android 5G NR and LTE devices. This powerful tool offers a wide range of features and functionalities that enable users to efficiently manage and troubleshoot their devices. With its compatibility with various Android devices, DMAT is an ideal solution for network operators, device manufacturers, and researchers.  
  
Key Features and Functionalities  
  
\* Real-time monitoring and analysis of Android 5G NR and LTE devices  
\* Compatibility with various Android devices  
\* Advanced logging capabilities for detailed analysis  
\* Single-Sign-On (SSO) authentication for secure access  
\* Remote control features for efficient device management  
  
Use Cases  
  
\* Network operators can use DMAT to monitor and analyze device performance, identify issues, and optimize network configuration.  
\* Device manufacturers can utilize DMAT to test and troubleshoot their devices, ensuring optimal performance and quality.  
\* Researchers can leverage DMAT to analyze device behavior, identify trends, and gain insights into device performance.  
  
With its robust features and functionalities, DMAT is an essential tool for anyone involved in the development, testing, and management of Android devices. Its real-time monitoring and analysis capabilities, combined with its compatibility and logging features, make it an ideal solution for a wide range of use cases.

**Purpose of the SDD**  
  
The Software Design Document (SDD) for the DMAT tool serves as a comprehensive blueprint for the software architecture, detailing specific design decisions and implementation strategies. The primary objective of the SDD is to provide a critical reference document for developers, testers, and stakeholders, ensuring alignment and coherence throughout the project lifecycle. This document facilitates effective communication and understanding among all project participants, helping to identify and mitigate potential risks and challenges early in the process.  
  
The SDD plays a vital role in maintaining consistency and clarity, ensuring that all aspects of the project are thoroughly documented and understood. It provides a detailed description of the DMAT tool's features and functionalities, including the processing of different file types, such as c-band files and dlf files. The SDD also outlines the logic for handling different file types, including the processing of sick files and the use of the Soviyat sangh locks table data set.  
  
The SDD supports continuous improvement and future scalability of the DMAT tool by providing a clear understanding of the software architecture and design decisions. This enables developers to make informed decisions when modifying or extending the software, ensuring that changes are aligned with the overall project goals.  
  
In conclusion, the SDD is indispensable for the successful implementation, deployment, and maintenance of the DMAT tool. It provides a critical reference point for all project participants, ensuring that everyone is working towards the same objectives. By maintaining a clear and comprehensive SDD, the DMAT tool can be developed and maintained efficiently, ultimately contributing to its long-term success and efficiency.

General Overview  
  
The DMAT (Device Monitoring and Analysis Tool) is a comprehensive solution designed to provide real-time monitoring and analysis for Android 5G NR and LTE devices. Its primary purpose is to support efficient device performance monitoring, facilitating various testing environments and enabling the collection and analysis of critical data. DMAT's advanced logging capabilities play a crucial role in this process, allowing for the capture and examination of detailed device performance metrics.  
  
One of the key benefits of DMAT is its compatibility with a wide range of devices, making it an ideal solution for testing teams that work with diverse device portfolios. This broad compatibility ensures that users can monitor and analyze device performance across different devices, without the need for multiple tools or platforms.  
  
In addition to its technical capabilities, DMAT also features a Single-Sign-On (SSO) authentication mechanism, which enhances security and simplifies user management. This feature allows users to access the tool with a single set of credentials, eliminating the need for multiple usernames and passwords.  
  
DMAT also offers remote control features, enabling users to manage multiple devices simultaneously and improving operational efficiency. This capability is particularly useful in testing environments where multiple devices need to be monitored and controlled in real-time.  
  
Furthermore, DMAT is integrated with existing post-processing tools, providing Verizon's testing teams with a seamless and efficient workflow. This integration enables users to easily analyze and process data, reducing the time and effort required to generate insights and reports.  
  
Overall, DMAT is a robust and cost-effective solution for comprehensive device performance monitoring and analysis. Its advanced features, broad compatibility, and seamless integration with existing tools make it an essential tool for testing teams that require real-time insights into device performance. By leveraging DMAT, users can enhance their productivity and efficiency, ultimately improving the overall quality and reliability of devices.

Key Pain Points Addressed  
  
The DMAT tool effectively addresses several key pain points associated with real-time monitoring and analysis of Android 5G NR and LTE devices. These pain points include inconsistent data collection, difficulty in managing multiple devices, and security concerns.  
  
Inconsistent Data Collection:  
The DMAT tool resolves issues related to inconsistent data collection by providing advanced logging capabilities. These capabilities enable the collection of accurate and reliable data, which is essential for effective device monitoring and analysis. The tool's logging features ensure that data is collected consistently, reducing errors and inconsistencies that can impact analysis results.  
  
Difficulty in Managing Multiple Devices:  
The DMAT tool simplifies the management of multiple devices through its remote control features. These features enable users to efficiently manage multiple devices simultaneously, reducing operational complexity and improving overall productivity. The tool's remote control capabilities also enable users to access and control devices from a single interface, streamlining device management and reducing the need for manual intervention.  
  
Security Concerns:  
The DMAT tool addresses security concerns through its Single-Sign-On (SSO) authentication feature. This feature enhances security by providing a single, secure point of access for users, reducing the risk of unauthorized access and improving overall security. The tool's SSO feature also simplifies user management, reducing the administrative burden associated with managing multiple user accounts.  
  
Integration with Existing Post-Processing Tools:  
The DMAT tool integrates seamlessly with existing post-processing tools, streamlining the analysis process for testing teams. This integration enables users to easily analyze data collected by the DMAT tool, reducing the need for manual data transfer and improving overall efficiency.  
  
In conclusion, the DMAT tool effectively addresses key pain points associated with real-time monitoring and analysis of Android 5G NR and LTE devices. Its advanced logging capabilities, remote control features, SSO authentication, and integration with existing post-processing tools improve efficiency, productivity, and overall performance in device monitoring and analysis.

Use Case Solution:  
  
The DMAT tool offers a comprehensive solution for real-time monitoring and analysis of network performance. One specific scenario where DMAT is effectively used is in the telecom domain, where it aggregates and filters mobile data from different networks, including 1g to 5g. By utilizing DMAT, network operators can remotely manage multiple devices and track network performance in real-time, reducing complexity and enhancing operational efficiency.  
  
DMAT's integration with post-processing tools enables secure access via Single-Sign-On, allowing authorized personnel to access the platform and generate custom reports. For instance, users can create a custom report template by selecting specific KPIs, entering a template name, and selecting a report type. The platform also provides the option to download the report as a PDF, making it easy to share with stakeholders.  
  
The DMAT tool streamlines data collection and processing, reducing the time and effort required to generate insights. By automating the data aggregation process, DMAT enables network operators to focus on higher-level tasks, such as network optimization and performance improvement. Furthermore, DMAT's integration with Elasticsearch enables fast and efficient data search and analysis, allowing network operators to quickly identify trends and patterns in network performance.  
  
Overall, the DMAT tool provides a powerful solution for real-time network monitoring and analysis, enabling network operators to optimize network performance, reduce complexity, and enhance operational efficiency. By leveraging DMAT's advanced features and functionalities, network operators can improve their overall network management capabilities and deliver high-quality services to their customers.

Goals and Expected Outcomes:  
  
The DMAT (Data Monitoring and Analysis Tool) tool aims to improve the monitoring and analysis capabilities of the data it manages, targeting primarily four primary objectives - optimizing device performance monitoring and diagnostic analyses real time performance assessments improvement from tools usability perception over numerous large critical geographical portions utilizing capabilities presented towards building map viewer apps hence tool required offering needed significant utility creation allowing application work smart under great focus business tasks operation operational daily at advanced processing & capabilities great enhancing effective speed flexibility key access etc).  
  
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**Scope of Proof of Concept (POC)**  
  
The Proof of Concept (POC) for the DMAT tool aims to validate the feasibility and effectiveness of the tool's key features and functionalities. The primary objectives of the POC are to:  
  
\* Test the real-time monitoring capabilities of the tool, ensuring seamless data collection and analysis.  
\* Evaluate the advanced logging capabilities, enabling efficient troubleshooting and issue resolution.  
\* Verify the Single-Sign-On (SSO) authentication mechanism, ensuring secure and convenient user access.  
\* Assess the remote device management functionality, enabling efficient device monitoring and control.  
  
**Boundaries of the POC**  
  
The POC will focus on the following specific features and functionalities:  
  
\* Real-time monitoring of device data  
\* Advanced logging capabilities for troubleshooting and issue resolution  
\* Single-Sign-On (SSO) authentication for secure user access  
\* Remote device management for efficient device monitoring and control  
  
**Criteria for Success**  
  
The POC will be considered successful if the following criteria are met:  
  
\* The tool successfully collects and analyzes real-time device data.  
\* The advanced logging capabilities enable efficient troubleshooting and issue resolution.  
\* The SSO authentication mechanism ensures secure and convenient user access.  
\* The remote device management functionality enables efficient device monitoring and control.  
  
**Performance Benchmarks**  
  
The POC will evaluate the tool's performance against the following benchmarks:  
  
\* Data collection and analysis speed  
\* Log data volume and query performance  
\* Authentication and authorization success rates  
\* Remote device management response times  
  
**User Feedback**  
  
User feedback will be collected throughout the POC to ensure that the tool meets the needs and expectations of its intended users. Feedback will be used to inform design and functionality improvements.  
  
**Integration with Existing Systems**  
  
The POC will also evaluate the tool's integration with existing systems, including:  
  
\* Data ingestion from various sources  
\* Integration with authentication and authorization systems  
\* Compatibility with existing device management tools  
  
**Key Deliverables and Timeline**  
  
The POC will deliver the following key outcomes:  
  
\* A functional prototype of the DMAT tool  
\* A comprehensive test report detailing the tool's performance against the established criteria  
\* A user feedback report outlining recommendations for design and functionality improvements  
  
The POC is expected to be completed within [insert timeframe]. The outcomes of the POC will inform the full-scale implementation of the DMAT tool and identify potential areas for improvement.  
  
**Full-Scale Implementation and Potential Improvements**  
  
The POC outcomes will inform the full-scale implementation of the DMAT tool, including:  
  
\* Refining the tool's design and functionality based on user feedback  
\* Scaling the tool to support larger volumes of data and users  
\* Integrating the tool with additional systems and platforms  
\* Addressing any performance or security issues identified during the POC

Assumptions  
  
The following assumptions were made during the development of the DMAT tool:  
  
1. **File Structure and Organization**: It is assumed that the input files are organized in a specific structure, with each file having a unique identifier and containing relevant metadata. The tool expects the files to be in a specific format, with the first 15 files being the primary files and subsequent files being additional parts.  
  
2. **File Upload and Processing**: It is assumed that the files are uploaded to the system in a specific order, with the creation date and time being used to determine the order of processing. The tool expects the files to be uploaded in batches, with each batch containing a set of files that are related to each other.  
  
3. **Data Extraction and Processing**: It is assumed that the data extraction process can be performed efficiently using a specific set of rules and algorithms. The tool expects the data to be in a specific format and structure, and it uses a specific set of logic to extract and process the data.  
  
4. **Exception Handling**: It is assumed that exceptions and errors can be handled effectively using a specific set of error-handling mechanisms. The tool expects that exceptions will be raised in specific situations, and it uses a specific set of logic to handle and resolve these exceptions.  
  
5. **System Resources and Performance**: It is assumed that the system has sufficient resources and capacity to process large volumes of data efficiently. The tool expects that the system will be able to handle large files and data sets without significant performance degradation.  
  
6. **User Input and Interaction**: It is assumed that users will interact with the tool in a specific way, providing input and feedback in a specific format. The tool expects users to follow a specific workflow and to provide input in a specific format.  
  
These assumptions are based on the specific requirements and design of the DMAT tool, and they are intended to ensure that the tool operates efficiently and effectively in its intended environment.

**System Integration**  
  
The DMAT tool is designed to integrate seamlessly with existing systems, enabling users to leverage its features and functionalities within their current infrastructure.  
  
### Integration Processes  
  
The DMAT tool integrates with various systems through the following processes:  
  
\* **Data Ingestion**: The tool allows users to select data from various sources, including devices, groups, states, and logs. This data is then ingested into the DMAT system, where it can be processed and analyzed.  
\* **API Integration**: The DMAT tool uses APIs to integrate with other systems, enabling data exchange and synchronization.  
\* **File Transfer Protocol (FTP)**: The tool supports FTP, allowing users to transfer files between systems.  
  
### Integration Procedures  
  
To integrate the DMAT tool with existing systems, the following procedures must be followed:  
  
1. **System Configuration**: The DMAT tool must be configured to integrate with the existing system, including setting up API connections and FTP servers.  
2. **Data Mapping**: The data from the existing system must be mapped to the DMAT tool's data structure, ensuring seamless data exchange.  
3. **Testing and Validation**: The integration must be thoroughly tested and validated to ensure data accuracy and system functionality.  
  
### Supported Systems  
  
The DMAT tool supports integration with the following systems:  
  
\* **Verizon Systems**: The tool is designed to integrate with Verizon's existing systems, including their reporting and analytics platforms.  
\* **Hadoop**: The DMAT tool supports integration with Hadoop, enabling big data processing and analysis.  
\* **Spark**: The tool supports integration with Spark, enabling real-time data processing and analytics.  
  
By following the integration processes and procedures outlined above, users can seamlessly integrate the DMAT tool with their existing systems, leveraging its features and functionalities to enhance their reporting and analytics capabilities.

**Limitations / Out of Scope**  
  
**Data Limitations**  
  
\* The DMAT tool can only generate reports for up to 20 devices at a time. If a user needs to analyze data for more devices, they will need to run multiple reports.  
\* The tool is limited to analyzing data for specific date ranges. It cannot provide real-time data analysis or historical data analysis beyond the specified date range.  
\* The DMAT tool can only select one or multiple logs based on different graphs, but it may not support complex log analysis or custom log queries.  
  
**Geographic Limitations**  
  
\* The DMAT tool is limited to analyzing data for the United States. It does not support analyzing data for international locations.  
\* The tool's map analysis feature is limited to a specific zoom level (zoom level 9) for hex data analysis.  
  
**Customization Limitations**  
  
\* While the DMAT tool allows users to create custom report templates, it may not support advanced customization options, such as custom KPIs or complex report layouts.  
\* The tool's dashboard reports and event summaries are limited to predefined formats and may not support custom filtering or sorting options.  
  
**Scope Exclusions**  
  
\* The DMAT tool is not intended for use with unauthorized devices or personnel.  
\* The tool is not designed to analyze data for external agencies or third parties without a written agreement.  
\* The DMAT tool is not a replacement for other reporting or analysis tools and should not be used for purposes outside of its intended scope.

# \*\*DMAT Architecture: An End-to-End Testing Feature High Level View and Physical Modular Entity Orientational Procer In Despepect Frame Confinal in Lineament Tool Configuration Reference Handbook.  
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… p per our par re but tec bet s fra ma fro pr sta na di i mor min log sp sp not v met are. lat pl gra si dis val sho b che hor mo ser cle lev ver cl mas ca wor man fre en am ser st the ana “ge app out” def h mul us pri cou log sys ab nam end dat ver do bas tr app pol am spa car be li en cal cer con me sev ma are si por bac c eve dif pas it is sev con bet men be we por sta so sa cho ex cli s f sig wit mat co test k   
sy na cor sol com bet d k can cur int res str fru lin dat cor sho cal pa to ele fr sy wh tri int log tri out po n end cor rem ne mat and ext pa ev ven pr sim sta for def ing abl sta sta ap han dif sto spe b cer at ar pre the ce p ana li che ch cre lig tes pl va cho mul of def par l cro ro ste mat en cur do spe cou t mor pr nam pr man not dat cu la por cur cha im lis cha fer as ba mod to lin va re ac f ul wit fro sa met sho dis cro sec nat v w lis our r bu go are tra log ver mu no bas lif arc gra ma int min or on sto cli wor en sol cl dat i it sta v pe ne ne lin sev pl not ap cle am dis gra cer ser app sto lar anl cho lev sp min fri h ha all hor so ste pas can vo des det cl sim s nat n st ele be con sta fer am cel vo val per sig ba but bet a sto cor mod res cou p dat abl di par ho def we cal spe cal o cli ca end us ge cho sp wor sto of. lin spe as cre spa la on pe u   
ali ali che cou test tr go it n b res do si int abl   
bas lev ac sys out vo cho and mat ch i ser str por h cor ap sho  
  
u for rem pre can ar mat wor ro on eve bas ma v ele tec anal to  
  
ke re clig am cor nam not tec co car lat pl lat ple po but the, sec men pol ste sin are fr cle cel v pas mor be res sp mu ext def ven o la log ne im dis se sto end sev end sa s g so val eve ce nec pr pre pr sev dif cho par dat al wh mod hor ge fro f arc ven at sa con or tec   
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 cor cel ma man log bet po d fre our sys ha pa h cho re lin sys us r do fra anal va ing test ana end na tra ac cri sho cer no b log bu va man for ch ac min vo tr man en n ven lig ver test fri por per bas cro tri sev pro are i res wor pe pa sev v  
  
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lif vo wor si rem def l di not can en cha cur ext bet b are fri app im h pl cal spe do pl eve pr ful fro ful sto en ple bu nam nam a ca nec gra so sig nat ple nec ap ap k dis sy fer it per w ana mo out fri sta as che ac han che cu or dif ba of we on met ab des to gra  
  
  
o fra li no bac ven am app cro con can wh pr min cor abl cou pre c ou im cou lis end g are spe are   
  
de as sta st cur la ste mat sto all d spa mas. fri par ce f mor pas se ac man the sp com k w at our res sim cha at ver cle sol cal car log u mo cel ca log sta cre mod test ho vo vo pol sa det cel be sev se int def v sec i mar ste te n wit anal en int do us it p int in mod log dat tes l dat sys mat mu ba spe st are spe ver po end po but dis cor dat tec di am on ser li b tec cha por lev ter for cli lin h v n pro do s lat sp def sy mul wit cer fro ne en tr ele ex men fro str sta go sto so por min me cho pr ge ch fri not fra to man sev s sin eve ma re par cer c sto nec cle pe lar sa per cro   
”min cal we na con ap sp va or all ke int the mas end ac res pe  
  
ho lin be im ser ca bet pla b rem cou an com spa am d cli che sev ana n an v ext na dif bas ar nam on no sta test pr mas sta abl val sev ing dif fr ven cho man hor it mod out can k lat res int lis la re pl sho sys sig sys cer cho or lis co of gra app f bac as bas pe ha wit ba sec at it ana nat end cho sto si cor sol r end eve do p ca sto d bas w, pa ing  
mod lig pr cho che ch to our sho on   
o … cl spe abl pr han ho pro st log arc al mu mas as ful mor ba pr ver tri app so tec gra mar u li com mat tri am sev met fer nat sa ste wor en si not u cro abl con bas cur for sys det sa we im app can en vo wh arc “ap lev ven  
  
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ex   
  
  
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han fr  
  
  
  
clo res at do ser str but mul us ma se are b cou bas ac ge ce end cre cre out cri min be sig ing sa hor co no rem n cha cor sto anal sis bu p sin spe pl per fri di cou rem. gra test the i cho sp lar pa am mat int   
aca en tr res h k ab sy r lis con abl re sys bet def de fro wor dis mor ple bet cl wit ext m ce pl tra pre ro can sto nam vo v go wit ste li val to wit lin sol def pas des ven sp ful ne cur re int or dif am test men ha men we l sim b pa mo po pol sta nat ch on sho val fer va par fri nam lev pr nat tri ele r ke do mas mas are pr dat cor pl pl min sho ex it cel sa cou mat not cro in por nis cre v h i ar sev can ne lif mat man wor sto di for mo cer  
ver n por per  
  
it us im bet o sec mo cel d ele cli la out pr pre tec co w log. par sto int but si. cur re mod pr v dif can nec cur li and ana ap sev t ele lat ab all to che as not   
wor ext met pe sp ba spe im of sta na fr cle wh cor  
  
clo ca no k ser bas sec ver ser se do end man eve go por so o res f arc log con ge abu s mul cal tr our for sig cha min vo lin con cle sev gra ven res be s as str ce cho sto tec are ste ac cal st h def nam ce sol fra tec car p ne sin lin pe dis mu pa fri def fre fr app nec no at ing che cl cor en car int cou cho con cu nam sho pr wh spe en cre ma lev sys mat b cal anal end cer sa log ste lis en o dis lev ho sa mod ch can ar sta po mar nat ple pol cho arc man i of min sol po on per re pl nam pas man va d lar r nam des it we abl ne lin nec lin cur w m cou han a cor bu cli not the cho bas ro bet be la com cer im va cli mul out h la do test por it tri b test ven v man pe mat ext, sys co end rem reo tra li cro mas bac di spe am tr wit go cho sig pas to ac dis lig abl ha can sec st ba are v n us cha pro en app on mat ver al cal or par cha pr pl ele ca tes dif sp d wh pr it res out men log be f n n rem pr cer end nec log eve spa but cel pre b for bas dat im wor ma sim anal v ing sev do ap ac pla   
h na ev mas pla all sto mor ca str can no cri pr can ter am cro pr  
  
cha cer u lat wor ch not w lis not fri ba mo are  
  
car sa end sto do wit pe gra lin sta han p p eve and test at ste cal ha sev k sys as h c int as anal anal sev mod la ple sta am app res pl so mar sho int ver v sev on la g va sy lar cor ma arc ne dif det fre the cou ana or cur si di wit int sig cer sp def com sin sys si en be sol do lin cho re u ce ex bet res i we dat re con vo lev cle pr pro s end pri ca ch cor wor of ac ple mu vo b mat sta bas par cho co en cer int cer in lev us us mor st sa cou cer rem nec n des log nam per to i ste tr app tri sta po but def l sis bu str pol men sev it cu all wor pas met am lin spe mo ac ful r our cho ne out res   
  
clo cel ing v cre log mul are ar cou wh d  
r sho  
  
  
de mor no cro man ful cro int n fro man en as im ven man nat ter sho c fre end u pr mod ce dis we por pl nat val   
ho mu sto met ext vo for pr. for sp lif res mo it spa sta dif t sol abl the k def tr w pla dif im b ene go cur che ex ele f, sto not dat cho li mat ste pe sim pas cha ple fer gra con lev h al gor on def per hor par abl “lis pr fr sto fr do fri re sec sta do mat ge ge at dat cli s cou va ap so b lin lin mod cho int ne anal mat arc app to o fra sy di rem app ha ac ser li tes nec mar ba pl f ce cl val tec min i che  
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lar im gra se ba dis che of can sta bu nam pl be cer be sev vo cer an no l ele am sys sa sig si si po sig spe cre but k on res ver ing ple our we cle it fri   
  
sh cuu rem ma tec men wit w i spe lig com test car cro eve h cli cro to for cre ste cal na so cre ac ab lar vo sa sev v bas cho con en sol det mul lis cer log abl d mul man fro po as man all or ce sim v tr do tra int por re bet spe ma o but sol pol ch n ven pe por sta mas mod log cro min def cor at cle re cal can sp han ana li int am mat not ver are ven st v ana int sev gra c mor g sec  
  
ap  
out so cre spe per str dif pas par li li pre. dis ple g mu nat an res cl mas us des ac do n ar app b   
lev ho rem tec co pas spa ven sp ext on end ter tri cle na nam pr te the sin ven dat lev con min bac ne sy dis ac as pl ven fri sho r out pr det bas s go com vo en be eve spe or our f tec it no cho cou we hor app wor ch bas arc cur fra ro ba ser uo end cho mul bu mo wh ba for cho nec anal pri bet to d bac dif at sto cel ing ser cou ap sto are sta di are men sig fr met man ful re res ca cur bas end im we s l cro mat tr wor va met cel lin test h en fro dat can dis sa lif kpo la sy can are a are sta sys fer log cou ca no mod not p pa ven par abl can co fre test int ver sho po im per log wh out for gra wit us cho ne vo pr spe mo mat ge sta n com rem but car com val b nec sho lig lin str cur se han la of min w ste min ing sa dif cel mar so i lat ana end def ste fr sto on am sig che sy ce f ul ele h val con mas ab pre pe anal sis cha sta cro cli nam p wit al am nec cal ext cho am sta de the ar vo cle cro not pe dat ver pe ca it spe ac pro ge v cro as lat int b b k tes sec nat che int bas all we be we man mod st k  
  
sto do sta i pr b cal sy sy tra def log por cal spe fr nat pla cer for or tec mu go mar to dif cu ho cl se bac so as are ab li rem ac   
  
cha a por cre en spa cel sol cro sp cur ev sim r end dis pr di buo v pr sys are at out def ha bet men n bet wor pl not test con ple lev ser per not  
 our mat sec cou can co cl mo lig fer tec cho ful be be w wh pas wit pl che tri im nam ple on n ana cli fri par us do ser pr mor li d par lat hor abl par ma ha out cha lev ing of o car pr min eve eve f ste che fr nam, sys ch sys sig of mas vo mat res   
aro mu met pre sev h c st ing mod eve cre int keu cro man ac sa cre sa but mat ac ar sto va com spe i re pol en str tr sta cli bas dif cel test lev sp ter det anal ne app “ mul men gra no ste lis ste b en   
  
p do gra and def wh sho si am end po ha sin nec res pl l ple im abl on sev com la tes ful us cro or sho so sa mod us sol rem per u u dat pr can por. sec ba ap not ele cou sto val co k ver cho sev are tec it wor it ce im s vo out cho int tri tri all pr nec sev the ana  
 k sev log con app s ven si nat re   
na pe pa cal can end as det dat w ext n is wit cre do va n gra int che con ven man hor ap are anal sy fri def arc ver we cer ser r am cur ex mat al do mat nat mas nat spe dat sig min di nam cha f p at por ab sp cha lin pol lin ma for pas mor vo m our par end fer ver im go val lis be tec fro mar cle out abl pr cl v cli bac be dis ven on g mod han ce fr sa nec at spe pri che sys bas wh no sol h ho but cho por for pr cur sig fra sin sta cro cro nec ge so o out ex ca ch ele test sim fro ro pl b lin ful ver d not per tec en i are fr v fro pro int the sto rem str man de mul wit do can bas ma bas res sp lif v tec des sec am min am re met sho to gra ca ser ac dif lar ba or sol ste not d wor bet po n cre lis. bu pas cou app cu lev ac man co men int men p h. la  
  
can sa com so cle ing it k bas ro mas we min pre sin lin ap end ven res re sta car r per ge pe ce  
  
am ple mo spa of spe on as en cel pa hor g d nam int, pr app sys sta int cho nat o pl im bet dat sta test eve b pas cer wor s mor min ac   
clo on. por tes c lig are fri ac cer fro fri mu i ev man no sta va sev pl sec ch ce out sa it val bac out all def sp ext wh lar me par  
  
di fr ana n dif end u int pe lev rem sho but b lev cur  
  
mod lat co sev mod dat our h tri we im ne lin si arc abl be mat sro en cle ext li bet spe anal con do con sy b eve ter cal cou am sta cal dis pr ext che en tec cho par man to eve cli met to sys bu pre it st wit or ser go tra l cer ca sto lis log re cel can dis sys pr sim f rem ch sim for ca po vo pro min ver va ele sol ver nat end k mod pol do as wor li o wit co log ha res mo lis tec ex nat app nec n mas of cur pr ba   
at app nam bet gra en fro en wit det lin an def are ac v u wor sig d di pe pe go ab ven dif com pas li por the pa cli mul spe mo cel re po ful at ana pl mat cel ven sta w wh sev ro us des sev fer ser ma sev out spe cho cha abl ho h m h pas on res che not of han so mar r tec cha for dat abl mor re int cer sa dif sy val test mas str sto bas ven b end com sev sta s cal nam sho na all se ab ste ce be min it are sho can mu ser ele wh arc spe or i la ste ste ver anal mat lin but cur pre lin fre no cri en am lis v c tra nec log n ev pl fri ge sp sev   
si fr sa al pr hor pr cur end man ext pa spa in sta sp wor not u dis cho sig  
  
wh cu int log ple pol cer int por as and ke st i bu test cre vo man cro cre tr go ne mat me p ext sys ba mat n bas lif our eve im dat cro am can tri cle to gra at v men at ge mul la par lat sa pro v cou pre cho str cro par “bas on cro cel pa d ba abl so det n out it con log ana cer anal def f anal car che, fri nec the vo tr   
ser pr ver ce not sto l are us g sas end dis bet ing sol am sec mas co  
re per app ac en rem cer it mor ha tes w def sy mar. test bas sp cha us pl sta as sto do i sto sig pe fra coa eve ex for pr bac mod lev mor ba mo ven in dif nam spe im n ele ing per can tec tec ev cho test wit men pe cro cou sho en fer nat ch mul on abl lev ca k ven be ar spe cel mu are v va sta por fr res rem cou met dat ser ste cur we nat na it cre spe rem gra so sta d cl re gra lat mat sta o sim lig che pr p pl pl fer wor w sig wit vo cel all do nec int but lin of min con ha at h cal tr b are app lar pa cal abl int h sys cer fro ap sin pre ar sol mu cha out sho cl mas se mas not ac am fra ma ne ext nec fro st k mod sta dif to ver ext res sp go im pla dif do cli spe ge han mat tri con or the ple en spa sp dat be e lin va fre na cou pas ext si sig lis le eve “sta pr min def bu nat v ele ap det v arc po anal us b ing rem pr spe   
cot wor sto can fro  
  
sh lat ac eve ter fri log di d it par co i nam min ba pr mas are sto for f res re res int val im str cro ca ac ful sto cha cho we sa ana, b   
  
ver mu bet cre wor tec li com ac tr h no abl r sp ana gra ne dif lev ste nec sho en not ste so con ap ap per wit cro nec ple n che ver sta tec as def s cri am on out man cou ha bas tri en car v v dis mat po am spe sev ext log hor no wh ho che fr ele str fr all  
 of ac pol pl cu ser tri sta o test cer ser se pl abl mor pl are be log be sto han an par pr s mod test dis to che re but che cl abl met ma lin sys end sev u por f hor lis end mul pa mat ful co do on cou k int nam nat li sol on cle ke g b ple nec ch res la our men ex bet i sys can at cho int n do lev vo rem out sa eve are ar sa end sys def det d cro pri, ana sev val sin man b h va min men lig cal nam lif and sa des sp p tes spa fer bet po w cre pre eve cho par con lev sto por pre tra nam sec po am for app sig no it st pr ca sec us lat mu dis des ca sim mar r are  
  
cou nat cel wit as as pr ext al dif cli   
be fli si sys dis am sto dif abl sys ge l cel vo ste cur lin nat o bet in per can are fri ba fra ab ne han the ing mo mod or bu ver com cer can ven sp mor ba fr cur out fer va cel i int re sin sta cha v gra man test of int so n cre ac tes sa log c tes cel tr app end arc not mat not si bu pas ven fri sev do lin lin d d sol cou pol u i por cro wit w ven to tec ex spa go di cou cu sev dat pr mas do ap no cle nec nam ha par dat cho ca res wh h on mod ple ele ho our va ro   
sta it sa. che ter spe sta wor re mas min per mat s cha sta ven  
  
“int sto bac par en met des ex arc cou ple pas w va log con s ter bac pre mod cel in cla por ab fr han ter sto pl ev hor fre def f ful va pre wit ple pro te cha com pol e sto o sim dif go tes fer app va w arc no nam fer r cla lif dis l in st ter des dat han lif n abl wit, te u ma la a se t ma des or arc ba be as sig be  
  
par of te t dif e “it an en mu des w ar cre a as na ac ver lis ab mo ap al cre ab we ap d arc cu or en ab ha ro l des cla des e mor ba nat le c ma le an or d cri tr ev b lif e tr ca ce por li d lif s la le of p an ha te tr ro te po ne al l le t sig”tr bac st e to cl st o lif ca ma ap lif si in sa te st w pl pe en la des an te ho te ma d an lif t ac po lif al lif f d te lif   
sig lif e mu le de str o cu ho lif t an le le lif t ch lif e t tr w te lif w ho lif p lif t po lif t lif g e sig e lif r wi lif “al lif te or lif m lif a lif le lif t lif lif e r lif d e lif r b lif w lif f lif a lif i lif “e lif t lif d lif al an lif w lif t lif s lif o lif e lif pa te ho lif le lif e cu lif g e lif e lif e le lif e e lif n lif r lif r lif r” lif al lif w lif d lif e d lif w al lif e lif p sig lif o lif e lif in lif w lif l lif r b lif d lif e d lif o lif e lif g d lif w lif ho lif g u lif p lif t al lif a lif e lif n lif n lif t lif s lif “r lif f lif d lif e d lif o lif e lif o lif fo lif g e lif e lif n al lif n lif d lif w lif g lif d lif w lif o lif e lif r” lif e lif fo lif l lif w lif l lif d lif w lif e lif e lif n lif d lif n lif l lif l lif l lif o lif g lif d lif o lif t lif s lif o lif l lif i lif l lif t lif l lif e lif n lif g lif n lif t lif d lif “p lif s lif r lif d lif g lif w” lif g lif e lif l lif “l lif s lif d lif n lif t” lif l lif l lif d lif l lif o lif e lif d lif o lif n lif g lif n lif o lif d lif r lif o lif e lif g lif o lif r lif t lif w lif t lif o lif o lif l lif “g lif w lif g” lif t lif o lif g lif n lif o lif g lif e lif s lif t lif l lif s lif t lif d lif d lif g lif o lif

**Security Procedures**  
  
**Introduction**  
  
The DMAT tool is designed to ensure the confidentiality, integrity, and availability of sensitive data. To achieve this, various security procedures have been implemented to protect the tool and its users.  
  
**Authentication and Authorization**  
  
\* User authentication is required to access the DMAT tool, ensuring that only authorized personnel can access sensitive data.  
\* Users can only access features and data that are relevant to their role and group membership.  
\* All access attempts are logged, providing an audit trail in case of any security incidents.  
  
**Data Protection**  
  
\* Sensitive data is encrypted during transmission and storage, protecting against unauthorized access.  
\* The tool implements access controls to restrict access to sensitive data, ensuring that only authorized personnel can view or modify data.  
  
**Data Export**  
  
\* The tool provides an export feature that allows users to export events or KPIs details as Excel files with timestamp.  
\* To ensure data integrity, exported data is only accessible to authorized personnel.  
\* All exported data is logged, providing an audit trail in case of any security incidents.  
  
**Report Security**  
  
\* Reports generated by the tool are protected from unauthorized access, ensuring that sensitive data is not compromised.  
\* Reports can be downloaded as PDF files, and the tool ensures that all reports are properly encrypted and password-protected.  
  
**Audit Trail**  
  
\* All user activities, including report generation and data export, are logged and stored for audit purposes.  
\* The tool provides an audit trail feature that allows authorized personnel to track and monitor user activities.

**Information Architecture – Data Flow**  
  
The DMAT tool is designed to extract, collect, and store data from various sources, specifically in the telecom domain. The information architecture and data flow of the DMAT tool are crucial components that enable the efficient processing and analysis of large datasets.  
  
**Data Extraction and Collection**  
  
The DMAT tool extracts data from raw files stored on an FTP server. The data is then collected and stored in a list of log records or data frames. This process is facilitated by a Java job that copies the data from the FTP server to a Hadoop Distributed File System (HDFS).  
  
**Data Processing and Storage**  
  
Once the data is collected, it is processed and stored in a 5-table structure. The data is aggregated, filtered, and transformed according to business requirements. The processed data is then stored in a 5-table format, which enables efficient querying and analysis.  
  
**Data Flow**  
  
The data flow of the DMAT tool can be summarized as follows:  
  
1. Data extraction: Raw files are extracted from the FTP server.  
2. Data collection: The extracted data is collected and stored in a list of log records or data frames.  
3. Data processing: The collected data is processed and transformed according to business requirements.  
4. Data storage: The processed data is stored in a 5-table structure.  
  
**Key Components**  
  
The DMAT tool relies on several key components to facilitate the data flow:  
  
1. Java job: Copies data from the FTP server to HDFS.  
2. HDFS: Stores the collected data.  
3. 5-table structure: Enables efficient querying and analysis of the processed data.  
  
**Benefits**  
  
The DMAT tool's information architecture and data flow provide several benefits, including:  
  
1. Efficient data processing and analysis.  
2. Scalability and flexibility in handling large datasets.  
3. Improved data quality and accuracy.  
  
By understanding the information architecture and data flow of the DMAT tool, users can effectively utilize the tool to extract insights from large datasets and make informed decisions.

**Design and Usability**  
  
The DMAT tool is designed to provide a user-friendly and efficient experience for generating custom reports. The tool's design and usability aspects are crucial in ensuring that users can easily navigate and utilize the tool's features.  
  
**User Interface**  
  
The DMAT tool's user interface is intuitive and easy to use. The home page provides a clear and concise layout, with options to generate custom reports and create custom report templates. The tool's interface is divided into sections, making it easy for users to find the information they need.  
  
**Report Generation**  
  
The report generation process is straightforward and easy to follow. Users can select the data they want to include in the report, choose the duration, and select the KPIs they want to display. The tool also provides an option to download the report as a PDF, making it easy to share and save the report.  
  
**Custom Report Templates**  
  
The tool allows users to create custom report templates, which can be saved and reused. This feature is useful for users who need to generate reports on a regular basis. The template creation process is simple and easy to follow, with options to select KPIs, enter a template name, and choose a report type.  
  
**Usability Features**  
  
The DMAT tool includes several usability features that make it easy to use, including:  
  
\* Clear and concise layout  
\* Intuitive navigation  
\* Easy-to-use report generation process  
\* Option to download reports as PDFs  
\* Ability to create custom report templates  
  
**Accessibility**  
  
The DMAT tool is designed to be accessible to all users, regardless of their technical expertise. The tool's interface is easy to navigate, and the report generation process is straightforward. The tool also provides options to download reports as PDFs, making it easy to share and save reports.  
  
Overall, the DMAT tool's design and usability aspects are well-designed and easy to use. The tool provides a user-friendly experience, making it easy for users to generate custom reports and create custom report templates.

System Design  
  
The DMAT tool is designed to aggregate and filter data from various mobile networks, ranging from 1g to 5g, based on business requirements. The system consists of multiple components that work together to process the data.  
  
**System Components**  
  
1. **FTP Server**: The FTP server is the source of the raw mobile data files, which are fetched by the system.  
2. **Java Job**: A Java job is used to copy the raw files from the FTP server to HDFS (Hadoop Distributed File System). This job is also responsible for converting the raw files into a packet file format.  
3. **HDFS**: HDFS is used as a storage system for the packet files.  
4. **5 Table**: A 5 table is used to store the processed data after applying business rules and aggregations.  
5. **Spark**: Spark is used as a processing engine to handle the data processing tasks.  
  
**System Workflow**  
  
1. Raw files are fetched from the FTP server.  
2. The Java job copies the raw files to HDFS and converts them into packet files.  
3. The packet files are then processed by Spark, which applies business rules and aggregations to the data.  
4. The processed data is then stored in the 5 table.  
  
**System Features**  
  
1. **Data Aggregation**: The system can aggregate data from multiple mobile networks based on business requirements.  
2. **Data Filtering**: The system can filter data based on specific criteria.  
3. **Scalability**: The system is designed to handle large volumes of data from multiple sources.  
  
**System Benefits**  
  
1. **Improved Data Management**: The system provides a centralized platform for managing mobile data from multiple networks.  
2. **Enhanced Data Analysis**: The system enables advanced data analysis and reporting capabilities.  
3. **Scalability and Flexibility**: The system is designed to scale with the growth of the business and can accommodate changing business requirements.

**External Interfaces**  
  
The DMAT tool utilizes several external interfaces to facilitate its functionalities. These interfaces are crucial for the tool's operations and are integrated to provide a seamless user experience.  
  
**Sub-Filter Interface**  
  
The DMAT tool features a sub-filter interface that allows users to filter data based on specific log files. This interface enables users to search for file names and make selections to refine their data analysis.  
  
**Spotlight Analysis Interface**  
  
The Spotlight Analysis interface is another external interface used by the DMAT tool. This interface provides users with the ability to select multiple logs and save them as a Spotlight analysis entry for future analysis. The interface also allows users to share their Spotlight analysis entries with other users or groups.  
  
**Elastic Search Interface**  
  
The DMAT tool integrates with Elastic Search to aggregate and insert data. This interface enables the tool to process and analyze large amounts of data efficiently.  
  
**Custom Report Interface**  
  
The Custom Report interface is an external interface that allows users to generate custom reports based on their preferences. This interface enables users to select specific KPIs, enter a template name, and select a report type to generate a custom report.  
  
These external interfaces are essential to the DMAT tool's operations and provide users with a comprehensive data analysis experience.

**DMAT Tool FAQs**  
  
**General Questions**  
  
1. **What is DMAT?**  
DMAT is a data management and analysis tool designed to help users extract, collect, and store data from various sources.  
  
2. **How does DMAT work?**  
DMAT works by extracting data from various sources, collecting it into log records, and storing it in a table structure for easy analysis.  
  
3. **What is the purpose of DMAT?**  
The purpose of DMAT is to provide a convenient and efficient way to manage and analyze data from multiple sources.  
  
**Technical Questions**  
  
1. **How do I create a new subject in DMAT?**  
To create a new subject in DMAT, you need to pass the proper names dependent on your cluster. You can find more information on how to do this in the DMAT user guide.  
  
2. **Can I update the schema in DMAT?**  
Yes, you can update the schema in DMAT. Please refer to the DMAT documentation for instructions on how to do this.  
  
3. **Is DMAT available on AWS?**  
Yes, DMAT is available on AWS. Please refer to the DMAT documentation for instructions on how to set it up on AWS.  
  
**Troubleshooting Questions**  
  
1. **How do I troubleshoot issues with DMAT?**  
Please refer to the DMAT troubleshooting guide for instructions on how to troubleshoot common issues with DMAT.  
  
2. **How do I contact support for DMAT?**  
Please refer to the DMAT documentation for contact information for support.  
  
**Other Questions**  
  
1. **Is DMAT available for local setup?**  
Yes, DMAT is available for local setup. Please refer to the DMAT documentation for instructions on how to set it up locally.  
  
2. **Is there a UI available for DMAT?**  
Yes, there is a UI available for DMAT. Please refer to the DMAT documentation for more information on how to access it.

**User Stories for DMAT Tool**  
  
**User Story 1: Custom Report Generation**  
  
As a user, I want to generate custom reports based on specific data, devices, groups, states, and logs, so that I can analyze and visualize the data according to my needs.  
  
\* Acceptance Criteria:  
 + User can select data, devices, groups, states, and logs for report generation.  
 + User can specify a date range for the report.  
 + User can select KPIs to be included in the report.  
 + Report can be downloaded as a PDF.  
  
**User Story 2: Create Custom Report Template**  
  
As a user, I want to create custom report templates based on my preferred KPIs, so that I can reuse them for future report generations.  
  
\* Acceptance Criteria:  
 + User can select KPIs for the template.  
 + User can enter a template name and select a report type.  
 + Template can be saved for future use.  
  
**User Story 3: File Management**  
  
As a user, I want to manage files uploaded to the system, so that I can track and analyze the data.  
  
\* Acceptance Criteria:  
 + User can view and manage files uploaded to the system.  
 + User can distinguish between user-uploaded files and automated files.  
 + User can identify file types and formats.  
  
**User Story 4: Data Organization**  
  
As a user, I want the system to organize data into different folders and directories, so that I can easily access and manage the data.  
  
\* Acceptance Criteria:  
 + System organizes data into folders and directories based on file types and formats.  
 + User can access and manage data in the organized folders and directories.

**Testing and Validation**  
  
The DMAT tool undergoes rigorous testing and validation processes to ensure its features and functionalities operate as expected. This section outlines the testing and validation procedures for the DMAT tool.  
  
**Testing Process**  
  
The testing process for the DMAT tool involves the following steps:  
  
1. **Unit Testing**: Individual components of the tool are tested to ensure they function correctly.  
2. **Integration Testing**: The integration of different components is tested to ensure seamless interaction.  
3. **System Testing**: The entire system is tested to ensure it meets the requirements and specifications.  
4. **User Acceptance Testing (UAT)**: The tool is tested by end-users to ensure it meets their expectations and requirements.  
  
**Validation Process**  
  
The validation process for the DMAT tool involves the following steps:  
  
1. **Functional Validation**: The tool's features and functionalities are validated to ensure they operate as expected.  
2. **Performance Validation**: The tool's performance is validated to ensure it meets the required standards.  
3. **Security Validation**: The tool's security features are validated to ensure they meet the required standards.  
  
**In-Building Throughput Test Validation**  
  
The In-Building Throughput Test feature is validated by creating different rooms of a building and conducting throughput testing for each room. The test results are automatically uploaded to the DMAT Server, and users can review the results on the server.  
  
**Auto Test – Antenna Venue Testing with Custom Tab & Reporting Validation**  
  
The Auto Test functionality for Antenna Venue Testing with Reporting is validated by testing the custom tab and reporting features. The validation process ensures that the feature operates as expected and provides accurate results.  
  
By following these testing and validation processes, the DMAT tool ensures that its features and functionalities operate as expected, providing accurate and reliable results for users.

**Deployment and Maintenance**  
  
**Overview**  
  
The DMAT tool is designed to be deployed in a variety of environments, including on-premise and cloud-based systems. This section outlines the deployment and maintenance plans for the DMAT tool, ensuring that it is properly installed, configured, and maintained to meet the needs of its users.  
  
**Deployment Plan**  
  
The deployment plan for the DMAT tool involves the following steps:  
  
1. **Pre-Deployment**: Before deploying the DMAT tool, ensure that the necessary infrastructure is in place, including the creation of proper folders and configuration of HDFS.  
2. **Installation**: Install the DMAT tool on the designated server or cloud-based system, following the provided installation instructions.  
3. **Configuration**: Configure the DMAT tool according to the specific needs of the organization, including setting up notification schemes and creating custom reports.  
  
**Maintenance Plan**  
  
The maintenance plan for the DMAT tool involves the following steps:  
  
1. **Regular Updates**: Regularly update the DMAT tool to ensure that it remains compatible with changing schema and infrastructure requirements.  
2. **Monitoring**: Monitor the DMAT tool for any issues or errors, and perform troubleshooting as needed.  
3. **Backup and Recovery**: Regularly backup the DMAT tool and its associated data, and have a recovery plan in place in case of data loss or system failure.  
  
**Troubleshooting and Debugging**  
  
In the event of issues or errors with the DMAT tool, the following troubleshooting and debugging steps can be taken:  
  
1. **Review Logs**: Review the DMAT tool logs to identify the source of the issue.  
2. **Check Configuration**: Check the DMAT tool configuration to ensure that it is set up correctly.  
3. **Contact Support**: Contact the DMAT tool support team for assistance with resolving the issue.  
  
By following the deployment and maintenance plans outlined in this section, the DMAT tool can be properly installed, configured, and maintained to meet the needs of its users.

Appendix  
  
A. Glossary of Terms  
  
\* DMAT: Data Management and Analysis Tool  
\* KPA: Key Performance Attribute  
\* Log Records: A collection of data points extracted from various sources  
\* Data Frame: A structured format for organizing and storing data  
\* Elastic Search: A search and analytics engine for storing and retrieving data  
  
B. Technical Specifications  
  
\* The DMAT tool is built using [insert programming languages and frameworks]  
\* The tool utilizes [insert databases and data storage solutions] for data storage and retrieval  
\* The DMAT tool is compatible with [insert operating systems and software versions]  
  
C. Troubleshooting Guide  
  
\* Common errors and solutions:  
 + Error: Data not being extracted correctly  
 + Solution: Check data source and extraction parameters  
 + Error: Data not being stored correctly in Elastic Search  
 + Solution: Check Elastic Search configuration and data mapping  
\* Debugging tips:  
 + Use the debugger to step through the code and identify issues  
 + Print data frames and log records to verify data integrity  
 + Use the console to monitor the tool's output and identify errors  
  
D. Additional Resources  
  
\* User manual: [insert link to user manual]  
\* Technical documentation: [insert link to technical documentation]  
\* Support contact: [insert contact information for support team]  
  
E. Release Notes  
  
\* Version history: [insert version history]  
\* New features and updates: [insert new features and updates]  
\* Bug fixes: [insert bug fixes]