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RBS Re-Parent Manager (RRPM)

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Abstract-This paper uses preemptive approach to avoid traffic congestion. With the exponential increase in the number of internet subscribers the data floating on the internet has increased 72x as compared to the internet traffic in 2009. The affinity towards heavy smartphones and data rich internet content further contributes to exponential increase in the data and this trend will continue and analysts across the globe do agree with that. This paper explains how network can be optimized by premeditating a possible congestion and take necessary measures in order to ensure a smooth user experience.
Key words: Activiti, RNC, OSS, UTRAN, UMTS, Predictive Analysis, Pre-cutover, Post-cutover, Re-parenting.

I.   INTRODUCTION

The increase in data growth causes resource shortages in the Radio Access Network (RAN). This results in RAN congestion which degrades the quality of experience to the subscriber. To effectively deal with RAN congestion, one needs to know where network congestion is happening and how to control or manage the traffic causing it. In our approach this is premeditated and using tools like Activiti a light-weight workflow tool which is an add on to eclipse and works well on the kepler version. For ensuring high quality services to consumers and overall network reliability. The significance of a basic grounding in broadband network management practices is further underscored by the fact that, as commonly recognized, mobile broadband networks confront a number of specific challenges.   Notably, the physical layer in mobile networks is subject to a unique confluence of unpredictable and unrelated influences.The 3rd Generation Partnership Project (3GPP) has endeavored over the last several years to standardize increasingly more robust traffic management (that is, quality of service or QoS) techniques for mobile broadband networks such as UMTS-HSPA and LTE. E2E QoS is contemplated in the 3GPP standards. However, QoS must be interpreted in light of the fact that mobile operators typically do not have full control over E2E provision of services that depend on mobile broadband Internet access. Innovations are needed throughout the mobile broadband ecosystem, in particular in the application development realm, in order to realize E2E QoS.   Further, transparency in network management practices will be important going forward, but requires a careful balancing to ensure consumer comprehension while safeguarding network reliability.
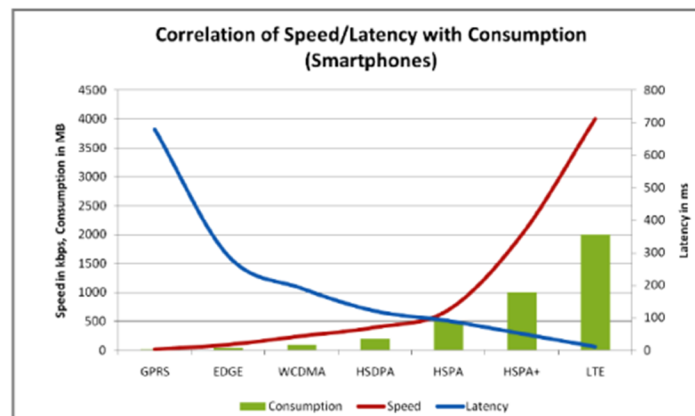

Fig.1 Correlation of speed and latency with consumption.

II.   PROPOSED SYSTEM AND ITS ADVANTAGES

The proposed system works in two phases first predict the swell of traffic in advance and then carryout re-parenting process.
Predictive analysis for RAN congestion management.
Differences and similarities in traffic patterns between hours

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Differences and similarities in traffic patterns between days

Provide accurate "just in time" (JIT) network information will accelerate the provisioning success rate.

Provide operators with the capability to predict and optimize network investment requirements and provide network engineers with the tools to optimally locate point-to-point routing demands from the traffic forecast.

Based on past capacity utilization, marketing demand forecasts as well as service consumption trends can provide network operations the tools to efficiently plan, process and predict network growth

For better accuracy, need to go down to the cell level, busy hour (or 15 minute) and also look at handset technology (2G, 3G, 4G).

Automatically determine the forecasting models that are most suitable for the historical data. Generate an appropriate model for each item being forecast based on user-defined criteria, and model parameters are automatically optimized.

Advanced predictive analytics coupled with preemptive SQM has the ability to improve operational efficiency by focusing the operations staff on problems with a large business impact

III.   RBS RE-PARENT MANAGER(RRPM)

Predictive analysis for RAN congestion can only give the data about how likely the congestion is going to happen and helps the engineer to rework on the RBS placement and the users assigned to them, this process id called re-parenting where in the input from the predictive analysis is taken into account and the re-parenting of the RBS and inturn the cells takes place this process is explained below:

Functional network elements

User Equipment (UE)

interfaces with user and radio

Radio Access Network (RAN, UMTS Terrestrial RAN = UTRAN)

handles all radio-related functionality

Core Network

switches and routes calls and data connections to external networks

Iu interface

connects UTRAN to CN

Iur interface

allows soft handover between RNCs

Iub interface

connects the Nodes and an RNC

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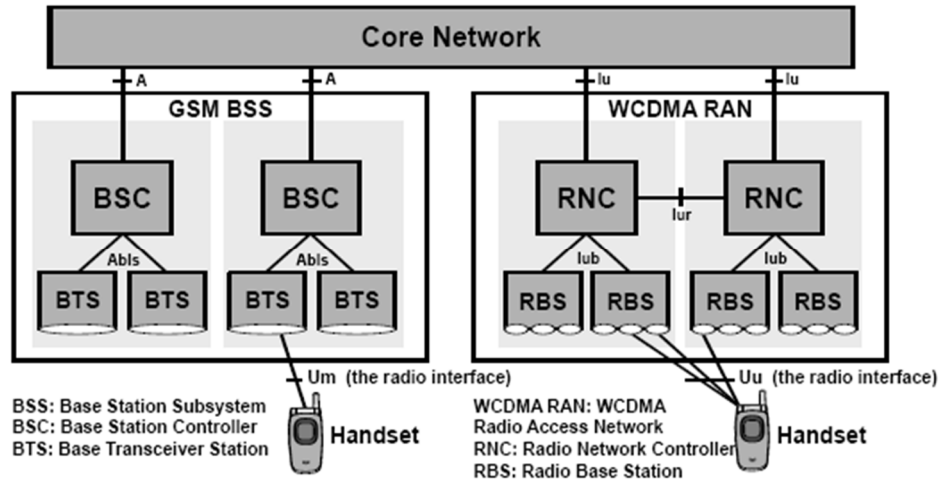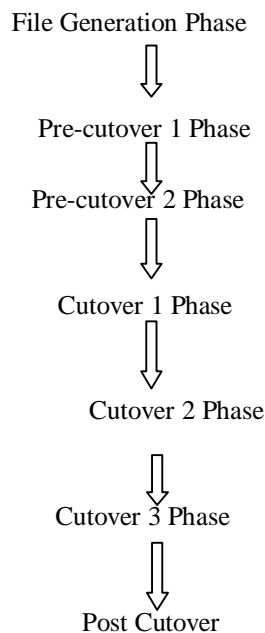

Fig.2 GSM/CDMA Network Architecture

Operations Support Systems (OSS), or operational support systems, are computer systems used by telecommunications service providers to manage their networks (e.g., telephone networks). They support management functions such as network inventory, service provisioning, network configuration and fault management.

The Radio Network Controller (or RNC) is a governing element in the UMTS radio access network (UTRAN) and is responsible for controlling the Node Bs that are connected to it. The RNC carries out radio resource management, some of the mobility management functions and is the point where encryption is done before user data is sent to and from the mobile.

The Re-parenting process is usually a premeditated maintenance operation carried out by the telecom companies to handle the expected increase in load on an RNC.

IV. THE PROCESS OF RRPM

There maintenance process is divided in 7 phases as shown below:

File Generation Phase

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Pre-cutover 1 Phase

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Pre-cutover 2 Phase

⇓

Cutover 1 Phase

⇓

Cutover 2 Phase

⇓

Cutover 3 Phase

⇓

Post Cutover

A. File generation Phase
In this phase .xml files are generated the reason why .xml files are generated is because of the easy of DataBase operations it offers

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over other files.

B. Pre-Cutover 1 Phase

Pre-checks are executed in this phase the main reason for execution of this phase is to check the RBS_ID of the source RNC and the RBS_ID of the Target RNC.

C. Pre-Cutover 2 Phase

The main tasks carried out in this phase are,
Backup source RNC, Target RNC and RBS.
Add RBs under Target RNC.
Create UTRAN cell under Target RNC.

D. Cutover 1 Phase

main tasks carried out in this phase are,
Lock source cells
Only intra-cell calls are allowed during this phase.
On-going calls are not disconnected during this phase.
New calls to Inter-cells cannot be initiated during this phase
Under the attribute ManagedServiceAvailability set   source RNC value to 0 and target RNC value to 1.
Backup the target RNC
Restart Node B's under target RNC.

E. Cutover Phase 2

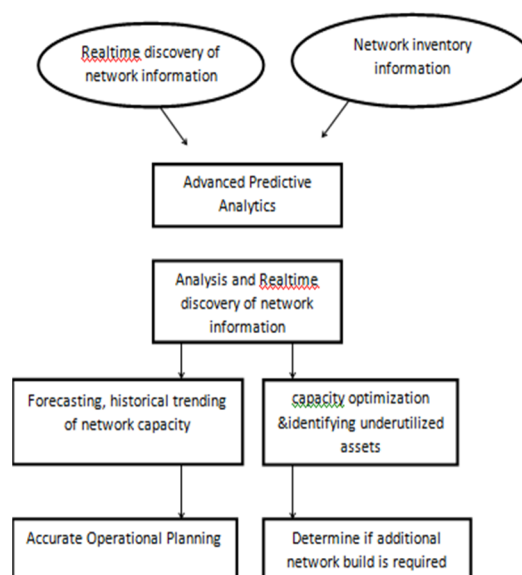The cells covered under the target RNC are unlocked.

F. Cutover Phase 3

The incoming/outgoing relations between source & neighbor, neighbor and target are replicated as in the source RNC.

G. Post Cutover Phase

This phase is the last phase where clean up and and backup is done The data in the source UTRAN cells and the RBS is deleted.

V.   RESULTS

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The combination and of predictive analysis and RBS reparenting techniques can deliver

Improved network health – The time, effort and technology leveraged by Skilled engineers amounts to 95% to diagnose the network issue before they can impact network health and operational performance.

Faster issue resolution – By using predictive analytics algorithms and rules, one can more quickly identify root causes, hidden conditions, and early warning signs that could potentially lead to outages

Decreased downtime – By proactively addressing issues or avoiding them altogether, the advanced platform enables you to achieve a 5X reduction in downtime

Reduced costs – Reduces support and operating costs by an average of 30%

Enhanced end-user experience – Proactive monitoring and enhanced network performance enable a superior end-user experience for your staffs around the globe

VI.   CONCLUSION

The idea is to combine the already existing RBS re-parenting process and to combine it with the predictive analysis. By bringing in the analytics into picture the re-parenting method which is static in nature can be made more dynamic. The existing RBS re-parenting procedures are carried out as a part of network maintenance and is a routine when there is already enough data to substantiate that there is a certainty of the traffic swell in that particular region so it is more of a traffic congestion avoidance procedure that is carried out to ensure smooth end user experience. But the swell in traffic is always not predictable so combing the predictive analysis will provide value to re-parenting and make it more dynamic.

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