

# Cisco Quantum SON Suite Automatic Neighbor Relations



## What Is the Value of Cisco Quantum SON Suite Automatic Neighbor Relations?

The Cisco® Quantum SON Suite Automatic Neighbor Relations for Universal Mobile Telecommunications Service [UMTS] Radio Access Network (RAN) equipment (ANR-U) application is a powerful tool to lower the rate of dropped calls, improve the RF quality in a cell area, and increase the utilization of RAN resources.

The Cisco Quantum SON Suite ANR identifies missing or redundant neighbors and automatically reconfigures optimal neighbor lists according to actual current priority. Addressing inter-frequency (between UMTS carriers) and intra-frequency neighbor (within a UMTS carrier) scenarios, the ANR constantly calculates the optimal neighbor lists per cell and service area, sorted by priority, and implements them automatically without user intervention. The ANR is based on real User Equipment (UE) measurements and RAN traces and performance measurement counters.

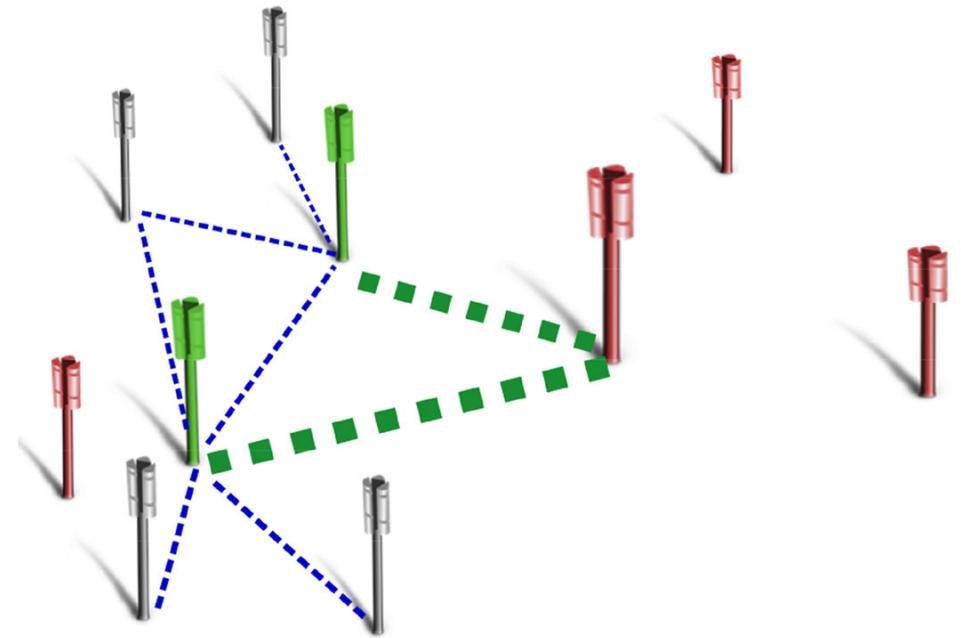
## What Challenges Does It Help Solve?

The main challenge is dealing with the massive volumes of analysis and large number of changes required to maintain an optimal interfrequency and intrafrequency neighbor list.

An optimal neighbor list is necessary to enable continuous, smooth transition between cells of high-quality calls, with full utilization of the existing network infrastructure. Incomplete or underoptimized neighbor lists can cause call drops, increase noise, and create extra load on the network.

Optimizing the neighbor cell list is a continuous process. The neighbor lists have to be reviewed regularly as network topology, local topography, and user behavior change over the course of the year (Figure 1).

Figure 1. Changes in Topography Require Revisions to the Neighbor List



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ANR provides closed-loop SON optimization in the following way:

- **Snapshot:** Detection of repeated missing neighbors, calculating optimal neighbor lists
- **Action:** Updating neighbor lists
- **Feedback:** Automatic near real-time feedback for neighbor relations added



**Table 1.** Comparing the SON Paradigm to Traditional ANR

	Traditional Method	The SON Way
<b>Triggers</b>		
Subscriber complaints	✓	×
Proactive, planned drive tests	✓	×
Key Performance Indicator (KPI) analysis	✓	✓
Covers entire network	×	✓
<b>Action</b>		
Automatic neighbor addition and deletion	×	✓
Automatic uniform enforcement of interfrequency and intrafrequency policies	×	✓
Can perform hundreds of changes a day	×	✓
Automatic self-healing functionality by rerouting cells from a site taken out of service without notice	×	✓
<b>Feedback</b>		
Automated feedback and solution verification	×	✓
Automatic rollback if necessary	×	✓
Drive test	✓	×

## Snapshot

- Collecting missing neighbor events from the Radio Network Controller (RNC) trace files, and correlating them with other KPIs to identify candidates for ANR optimization
- Generating updated neighbor lists and adding, deleting, and changing the priorities in accordance with the local radio network policies

## Action

The ANR performs the actual optimizations, adding, deleting, and reprioritizing neighbors from the neighbor lists. The commands are written to the Operations Support System (OSS) using the Dynamic SON framework level (an abstraction layer for the underlying network components).

If the ANR is set to create symmetric relations, the application will attempt to add and remove neighbors from the **To Target** neighbor list as well; that is, the action is also made in the reverse direction. For example, if a relation from A to B is created, a reverse relation from B to A will also be created, if it does not already exist.

## Feedback

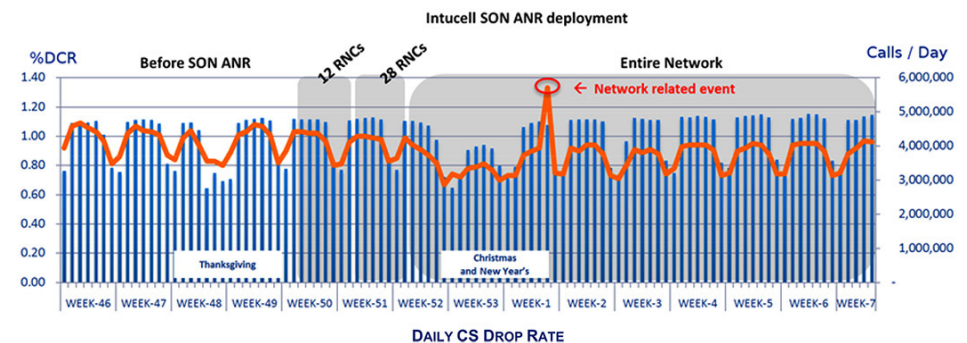
- Validate the improvement of the new neighbor list on the KPIs
- Maintain or roll back the changes performed

## Case Study

ANR's long-term effect on a network can be seen in Figure 2, taken from a leading operator. The graph compares the dropped call rate before activating the SON Suite ANR, through gradual implementation, and the long-term effect.

The dropped call rate can be seen to drop considerably and remain at a low level, while the number of calls remains the same.

**Figure 2.** Long-Term Effect of ANR on a Network



## What Are the Benefits of Cisco Quantum SON Suite Automatic Neighbor Relations?

The SON Suite ANR identifies neighbor list problems as they occur and fixes them automatically, before subscribers are affected or with minimal impact. The application runs continuously, dynamically adjusting to the network as it changes.

Since the processed volume is larger than with manual methods, the limiting KPI value (such as the dropped call rate) can be much finer. The outcome of this is that SON Suite ANR updates the neighbor list before the network KPI is significantly affected.

The SON Suite ANR increases the value of the network infrastructure, deferring or even avoiding site upgrades.

With the Cisco® SON Suite ANR, you have the peace of mind of knowing that the network will maintain uniform policy, for a level of KPIs that is not achievable using traditional means.