

# DMR Simulcast Solution

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# 1 Overview

## 1.1 DMR Simulcast System Function Introduction

DMR conventional (Tier II) simulcast system is mainly used in application scenarios where users are widely distributed, and multiple repeaters are required to form the network coverage, but the number of available frequencies for customers is limited. The system comprises multiple IP interconnected repeaters, but all repeaters in the system work at the same transmit and receive frequency, thus saving the frequency resource while providing wide coverage.

In Caltta's DMR simulcast system, the repeater hardware is based on PR900 but a simulcast board is added. Different model codes are used for the two repeaters in conventional system and simulcast system respectively.

One DMR simulcast system can support up to 16 repeaters, one of repeaters is the simulcast master and the others are simulcast slaves. The simulcast master and slaves are configured by CPS.

The simulcast master completes the air interface uplink frames selection process and distributes the downlink frames to all simulcast slaves.

## 1.2 Network Topology

In the typical DMR simulcast network topology, there are radios, repeaters (simulcast master and slaves), Ethernet switches or routers, network management and dispatcher and other equipment.

The simulcast master needs to be configured with a static IP. If all repeaters are located in the same LAN, the simulcast master can be configured with a static IP in the LAN. If multiple repeaters are connected cross a LAN, the simulcast master needs to be configured with a public static IP.

The network management server and dispatching server need to be configured with static IP. If all the equipment including the repeaters, the network management server, the network management client, the dispatching server and the dispatching client are in the same LAN, the network management server and the dispatching server can be configured with static IP in the LAN. If there is equipment that goes cross the LAN, then The network management server and dispatching server should be configured with public static IP.

The simulcast network supports dispatching functions such as voice call, text message, positioning, etc. The dispatching console carries out related dispatching services through the simulcast master.

The network management can see all the repeaters, also monitor and maintain all of them.

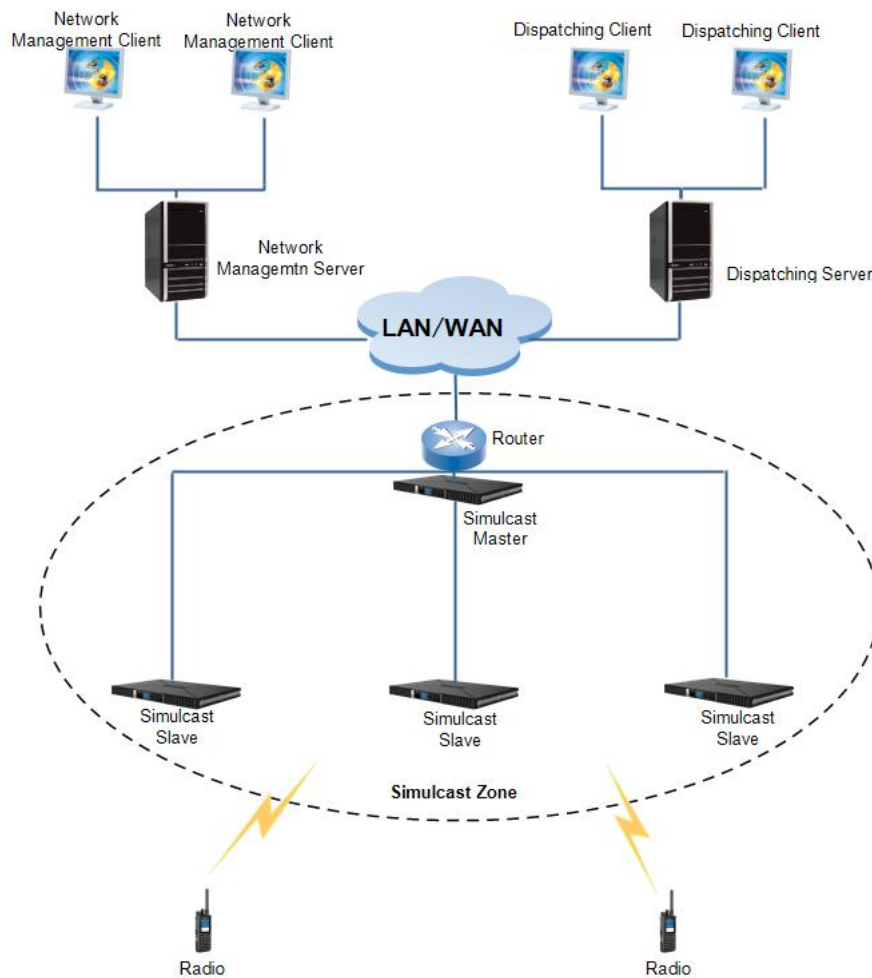


Figure 1 DMR Simulcast System Structure

The network management server, dispatch server, network management client, and dispatch client can be installed together in one computer.

Two repeaters, as well as the dispatching server and client, the network management server and client can be located in different subnets, and communicate with each other through the routers.

### 1.3 Restrictions

At present, it neither supports the intercommunication between multiple simulcast systems, nor does it support the intercommunication between the simulcast system and the conventional system.

### 1.4 Function List

The digital conventional simulcast system does not support analog channels, and does not support IP interconnection between multiple simulcast systems. Please refer to DMR conventional system

function list for other functions.

DMR simulcast system supports interconnection with eChat system.

## 2 System Specification

### 2.1 Single-pair Frequency DMR Simulcast System Specification

Number of registered users	2000
Number of registered groups	128
Number of concurrent calls	2
Number of concurrent recordings	2
Call delay	Related to network transmission delay
Number of dispatcher	8
Number of repeaters	16

### 2.2 Capacity Expansion Solution

If two simultaneous calls cannot meet the capacity requirements, and the user has multiple pairs of available frequencies, it is recommended to expand the capacity by overlaying the simulcast systems. It can support up to 4 sets of overlaid simulcast systems, sharing one network management and dispatching system.

Assuming that N ( $N \leq 4$ ) sets of simulcast systems are deployed; the specifications are as follows:

Number of registered users	2000
Number of registered groups	128
Number of concurrent calls	$2 * N$
Number of concurrent recordings	$2 * N$
Call delay	Related to network transmission delay

Number of dispatcher	8
Number of repeaters	16*N

### 3 DMR Simulcast Solution Highlights

- Reuse limited frequency to improve the network efficiency, saving frequency resource;
- Wide network coverage provided by IP interconnected repeater;
- Improved user experience supported by automatic roaming and handover;
- Private network and public network integration by interconnecting with eChat system.