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MOTOTRBO™

Capacity Plus Overview

v.4

Tim Clark, March 2009

Capacity Plus Overview



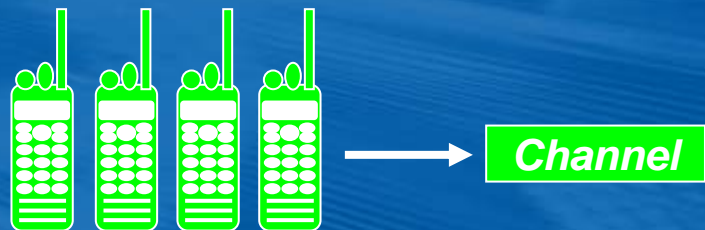
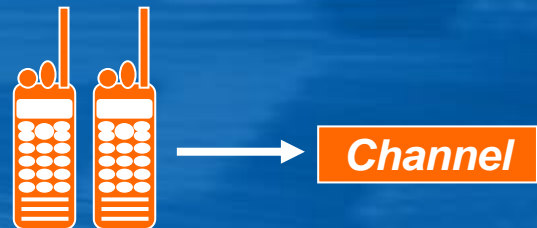
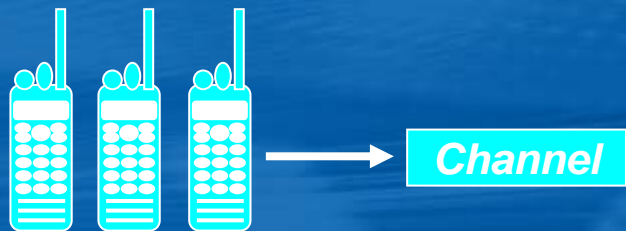
- Increase system **capacity** to 1200 users
 - Up to 8 dynamic voice/data channels
 - 1 to 4 repeaters = 1 to 4 RF channels = 2 to 8 timeslot channels
 - Plus dedicated data channels (up to 12 repeaters)
- **Single-site multiple channel management**
- **Quick call set-up**
- **Optimal channel utilisation**
- **Will be distributed as pay-for repeater software upgrade**
 - Pricing TBD
- **Available 2H 2009**

Conventional vs Trunking Systems



Conventional

Channels dedicated to talkgroups



- Low complexity, low cost

Trunking

Channels shared by talkgroups



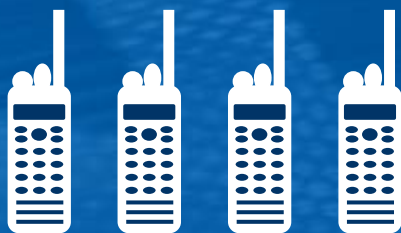
- More efficient use of channels
- Higher traffic density
- Simple user operation
 - automatic channel selection, call queuing

MOTOTRBO Capacity Plus



Note: "Controller" is a MOTOTRBO repeater software enhancement

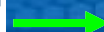
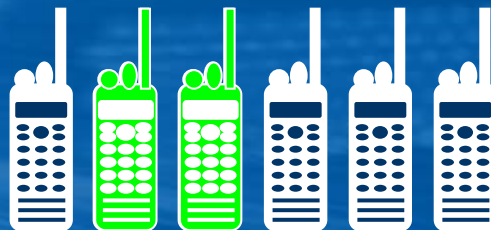
Controller



Channels



Rest Channel



Rest Channel

Quick call set-up

Capacity Plus Operation



- **All new voice calls always start on the Rest Channel**
- **When a call starts, the rest channel:**
 - Selects an idle channel to be the new Rest Channel
 - Informs all idle subscribers to move to it
 - Converts itself to a traffic channel
 - Begins repeating audio to radios
- **When a call ends on the channel:**
 - The repeater informs the radios of the new rest channel or channels of interest
 - The radios then move to those new channels

Typical Call Set-up Times



Solution	Call Set-up Time Estimates
MOTOTRBO	100-300ms⁽¹⁾
Capacity Plus	220-480ms⁽²⁾
MPT1327	300ms⁽³⁾
SmarTrunk	1 to 3 seconds⁽⁴⁾

(1) MOTOTRBO Conventional

- Group Call
- Talk Permit Tone Enabled
- “Call set-up time” is the time from PTT push to Talk Permit Tone
- Single Site
- If Repeater active, call setup time is just under 100ms
- If Repeater inactive, call setup time is just under 300ms
- Source: Motorola Engineering

(2) MOTOTRBO Capacity Plus

- Capacity Plus adds 120-180ms to conventional call setup time
- Source: Motorola Engineering

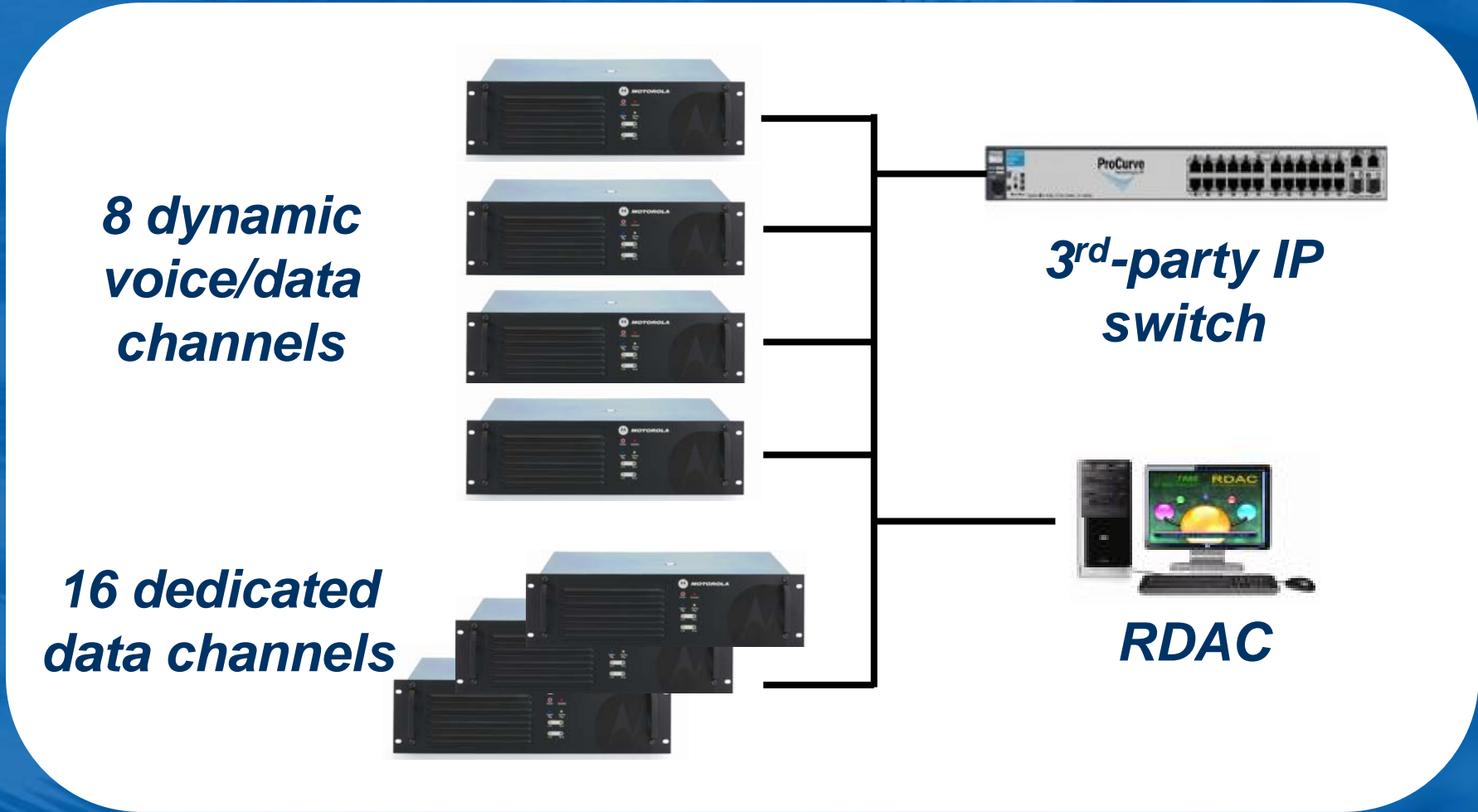
(3) MPT1327

- local Group Call
- Source: Fylde Micro

(4) SmarTrunk

- Source: SmarTrunk Systems website

Capacity Plus System Configuration



Dedicated “Data Revert” Channels



- **Offload data onto non-voice channels**
 - Up to 16 data channels
- **Subscribers will search for Data Revert channels**
 - Search list programmed into each radio
 - Radios will search through channels to find a free channel
- **Greatly increases channel efficiency**
 - Voice calls do not disrupt data
 - More data can be offloaded on system
 - Example: Faster GPS update periods

Capacity Plus Call Types



- **Individual Call, Group Call, All Call**
- **Emergency call**
- **Individual and Group Data message**
- **Confirmed & Unconfirmed Data**

- **Basic and Enhanced Voice & Data Privacy**

Prioritised System-wide All Call



All Call becomes a System-wide Call:

- **Transmission is sent to all radios**
 - Including idle and busy radios
- **Idle radios join call right away**
- **Busy radios (i.e. receiving other calls) join quickly**
 - Within approx 1 second
- **Busy radios transmitting on other calls will join after their call ends (if the All Call is still active)**

Capacity Plus Capabilities



- Call Alert
- PTT ID
- Radio Check
- Radio Monitor
- Radio Inhibit & Un-inhibit
- Talkgroup Scan
- **Late Entry** Talkgroup ID & Channel ID broadcast on rest channel

- **Not supported:**
 - Call prioritisation (except All Call)
 - Call queuing

Capacity Plus Overview



- Increase system **capacity** to 800 users
 - Up to 8 dynamic voice/data channels
 - 1 to 4 repeaters = 1 to 4 RF channels = 2 to 8 timeslot channels
 - Plus dedicated data channels (up to 8 repeaters)
- **Single-site multiple channel management**
- **Quick call set-up**
- **Optimal channel utilisation**
- **Will be distributed as pay-for radio and repeater software upgrade**
 - Pricing TBD

Other R1.5 features



- **Repeater LAN Interface ADK**
 - Detailed documentation to support 3rd party development
- **Lone Worker**
 - Alarm call transmitted if there is no user activity for a CPS-defined duration (i.e. button presses)
- **XCMP Command & Control**
 - Provides PC application with additional capabilities such as
 - Caller ID
 - Call Type
 - Caller PTT Status
 - Remote Monitor
 - Radio Disable/Enable
 - Call Alert
- **Improved data latency**
 - IP header compression solution to reduce the data header overhead, reducing the data transmission delay