BrandMeister
DMR Master Server

# BRANDMEISTER INTERNALS

Artem Prilutskiy (R3ABM)

r3abm@dstar.su

# CANONICAL APPROACH OF COMMERCIAL PRODUCTS

Applicable to:

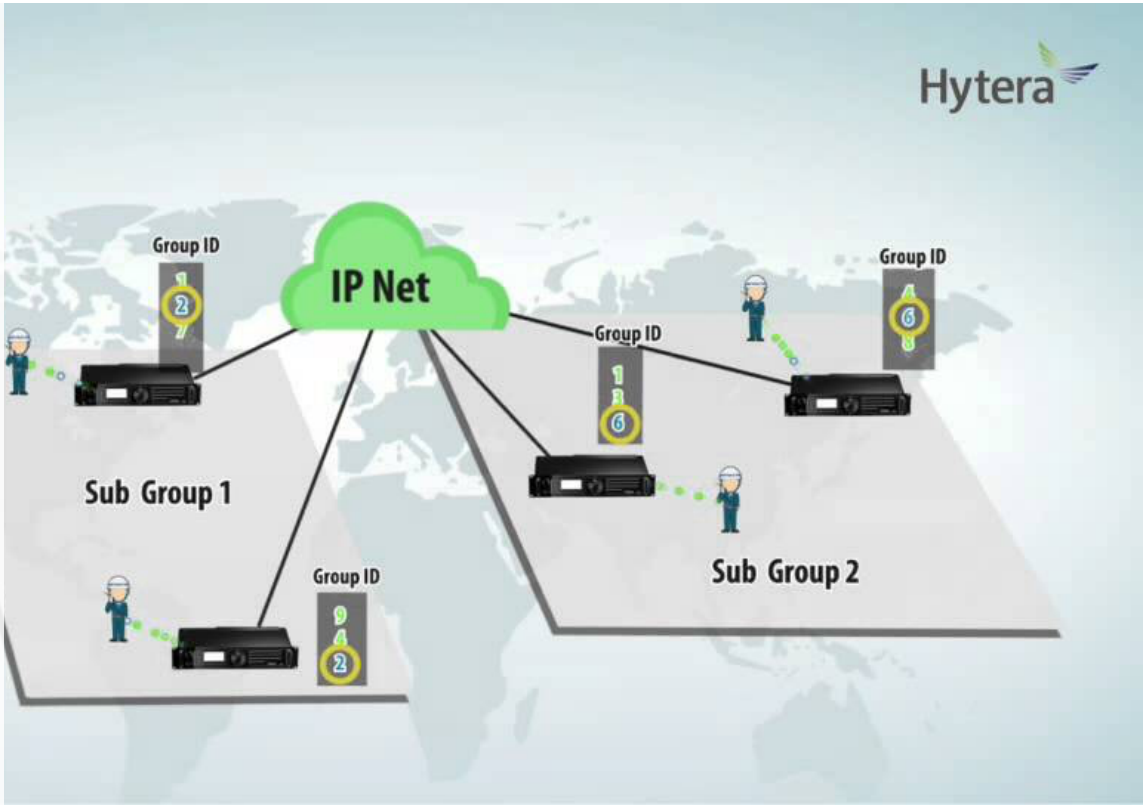
- Motorola IP-Site Connect
- Hytera Multi-Site Connect

Pros:

- Peer-to-Peer
- High availability
- No additional servers

Cons:

- Issues with reachability on the last mile
- Limited capacity
- Broadcast only (no switching core)




such as allowing multiple groups of sub IP networks

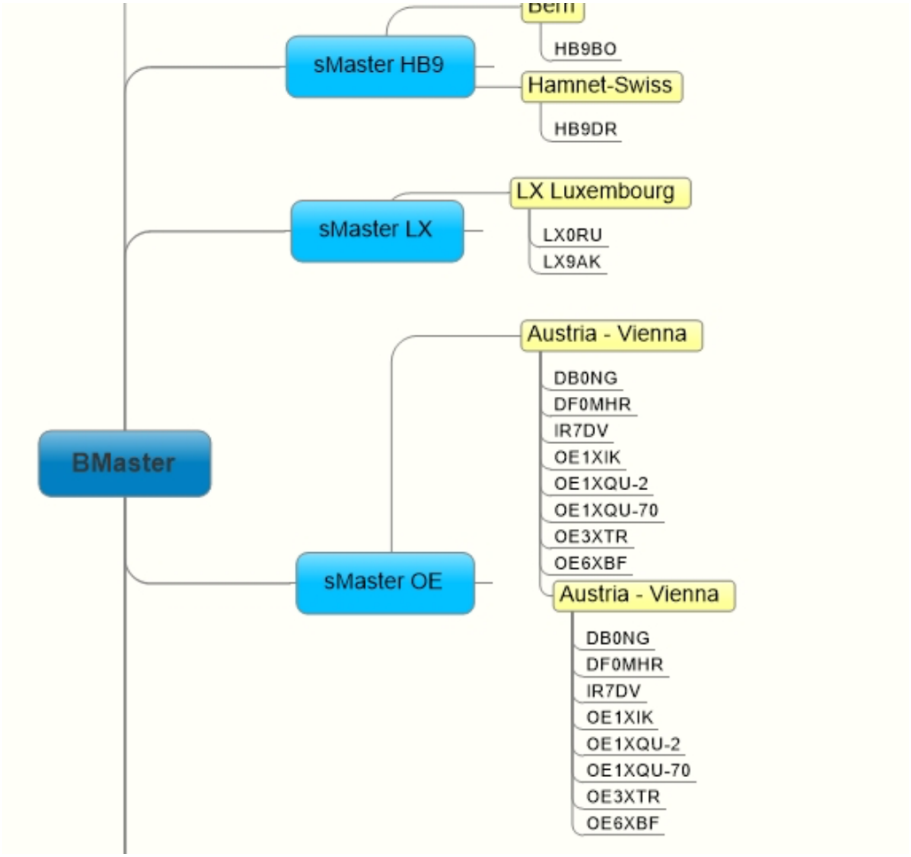
# DMR-MARC AND DMR PLUS

Pros:

- High compatibility with canonical solutions on the radio-access network layer

Cons:

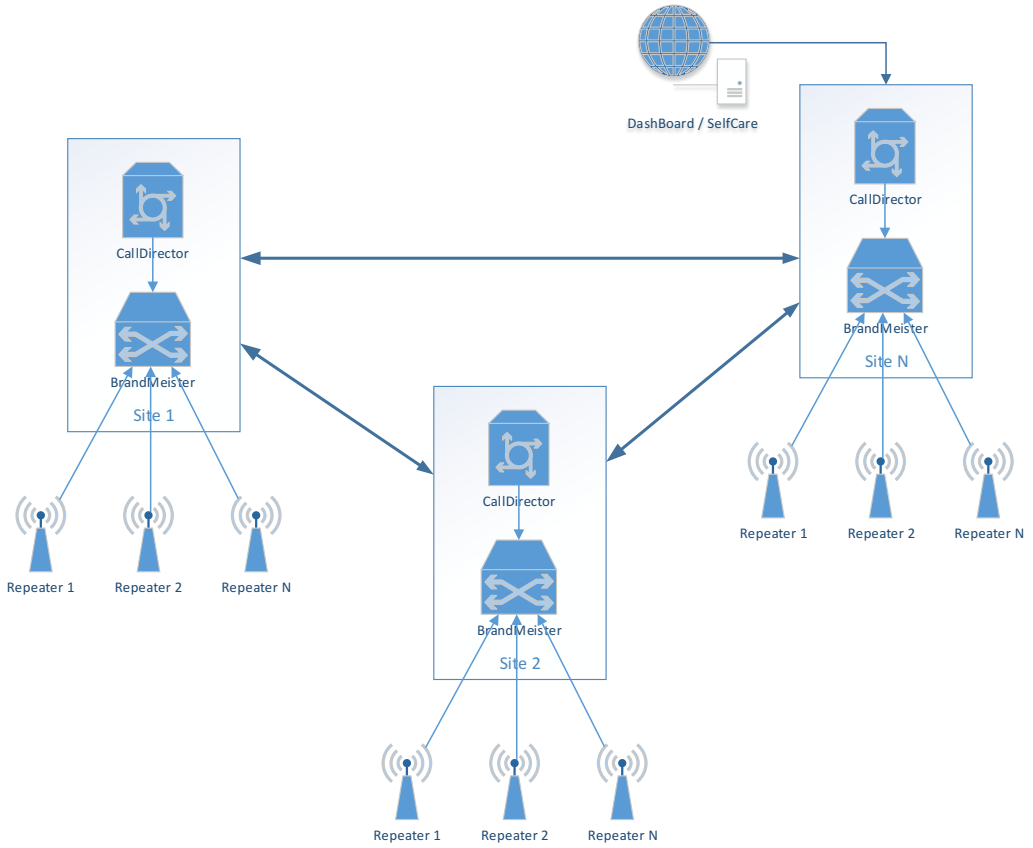
- Single point of failure on the top of aggregation (two BMaster of DMR Plus, quad root servers in DMR-MARC)
- Tough management of conferences



# BRANDMEISTER NETWORK APPROACH

Pros:

- Call switching
- High capacity
- Peer-to-Peer on the backbone
- No issues with IP-routing on the last mile
- Multi-protocol support



# BRANDMEISTER NETWORK COMPONENTS

| | | | |
|---|---|---|---|
| BrandMeister DMR Server (R3ABM) | MySQL Database | | Dashboard and self-care at DSTAR.SU (R3ABM) |
| FirePump Back-End Data Proccessor (R2AEE) | Mosquitto Queue Broker | Profile APIs (EA1HET) | Dashboard (PD0ZRY) |
| Hose Line (PD0MZ) | Configuration Files | Master APIs (PD0ZRY) | Brand New Dashboard Project Halligan (PD0ZRY & ON3YH) |

# BRANDMEISTER NETWORK NODE

- Debian Linux 8.x (x64)
- MySQL Server 5.5 in Slave Mode*1
- Mosquitto MQTT Message Broker
- Memcached In-memory Cache
- Apache Web Server + PHP for REST APIs
- **BrandMeister DMR Server**
- CallDirector (BrandMeister Network Dispatcher)
- APIs and Supplementary Tools by PD0ZRY

*1 - Will be replaced by TaranTool in Master-Master Mode

# BRANDMEISTER DMR SERVER

# MAIN FEATURES

- Call switching:
  - Private / Group
  - Data / Voice / CSBK
  - Call displacement based on priority (including emergency call)
- Flexible routing:
  - De-centralized Registry Database (location and user profile)
  - Location cache on each server
  - LUA Scripts
- Event Notification and Powerful APIs:
  - D-BUS
  - MQTT
  - LUA
  - JSON over HTTP (via PHP wrapper)
- Multiple protocol stacks (Motorola, Hytera, RadioActivity, Homebrew, etc.)
- Embedded voice and data applications

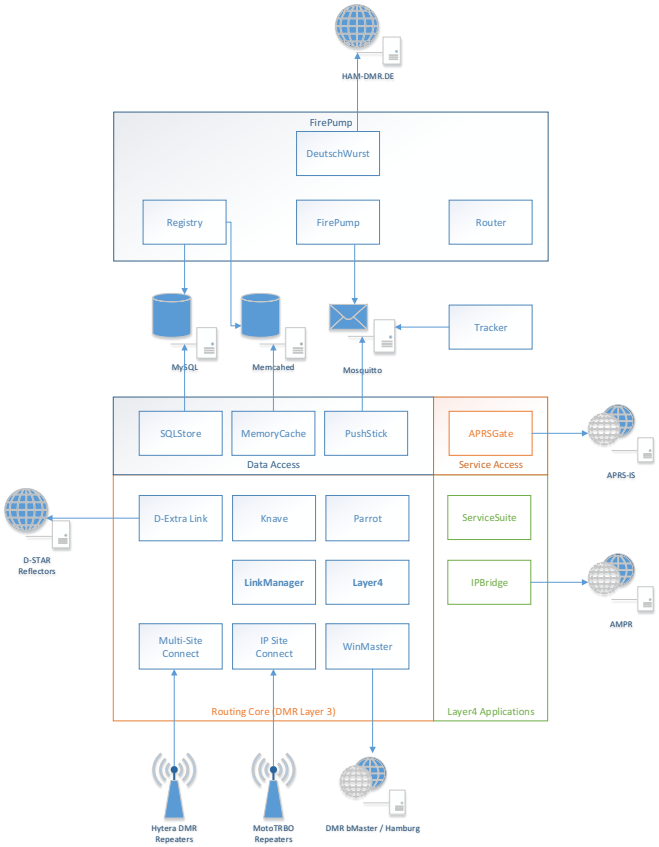
# EMBEDDED APPLICATIONS

- Common-use applications:
  - Interactive voice response (with national languages support)
  - Signaling expansion (UU-Req/UU-Resp)
  - Automatic registration/roaming
  - Auto-patch call gateway (ALSA + D-BUS)
  - SMS gateway
  - IP bridge
- Radio-amateur use:
  - D-STAR D-Extra or DCS to talking group gateway
  - D-STAR G2 call routing to private call gateway
  - Yaesu WIRES-X to talking group gateway
  - G4KLX YSF Reflector to talking group gateway
  - APRS location and telemetry
  - APRS text message gateway
  - AMPR access service
  - Gateway for EchoLink or any other IP-based PTT applications

# ARCHITECTURAL PRINCIPALS

- BrandMeister is only front-end application that works in real-time
- All business logic to distribute routing lists and user profiles implemented outside of BrandMeister like a set of back-end applications and scripts
- BrandMeister supports multiple sources of routing information: scripts, databases, in-memory cache, configuration files at the same time
- Web applications and diagnostic tools are also separated
- BrandMeister uses event-driven mechanisms (MQ) to notify back-ends about events, in-memory data storage and relational database to get location, routing and user profiles
- We are in the process of implementation of mesh-based distributed network storage
- In this paradigm all network servers will be equivalent, the network will be the most resistant to the loss of nodes

# LOGICAL COMPONENTS



# SUPPORTED EQUIPMENT (TERMINALS)

- Motorola MotoTRBO
  - Automatic registration and roaming (ARS)
  - Text messaging (TMS and ETSI)
  - GPS location reporting (LRRP)
  - Telemetry (control and execution)
  - Restricted Access System (on Motorola repeaters)
- Hytera DMR
  - Automatic registration and roaming (RRS)
  - Text messaging (TMP and ETSI)
  - GPS location reporting (LP)
  - Telemetry (control and execution, TP)
- Other equipment
  - Basic DMR services

# SUPPORTED EQUIPMENT (RADIO-ACCESS NETWORK)

- Hytera's Multi-Site Connect enabled repeaters
  - RD-625, RD-965, RD-985(S)
  - NAT traversal (no need to forward ports)
- Motorola's IP Site Connect enabled repeaters
  - DR-3000, MTR-3000, XPR-8400, SLR-5500
- RadioActivity KAIROS (in development)
- Homebrew DMR repeaters
  - G4KLX MMDVM DMR Repeater
  - DV MEGA Series Hotspot
  - SharkRF openSPOT
  - DV4mini Dongle
  - Any repeater based on specification of DG1HT, DL5DI and G4KLX
- **We are open to support other type of equipment**

# Q&A