



D-STAR

Russia & CIS

Artem Prilutskiy, R3ABM

e-mail: r3abm@dstar.su

Agenda

- Who we are?
- Project goals
- The technology
- Core network
 - Customized ircDDB
 - XRF250 reflector
 - RK3FWD (Border Gate)
 - The Tracker
 - APRS hub
 - AMPR Backbone
- Additional services
 - Dashboard
 - Interactive Maps
 - Self-Care
 - EchoLink bridge and Internet radio
 - Signal Monitor
- Participation in other D-STAR projects

Who we are?

- We started in June 2012 as infrastructure project of Moscow regions D-STAR team.
- Core systems was partially developed and deployed within summer 2012.
- During the autumn of 2012 we began operations outside the Moscow region. Now our network has nodes in Russia, Ukraine, Kazakhstan and and also among immigrants in some Western countries.
- We do R&D for core network and access network by ourselves.



Project goals

- Knowledge base in Russian with possibility of discussions
- Involving HAMS to technology given the ex-soviet mentality
- Build core network that solves technical restrictions and considering the requirements of the national regulator
- Develop a cost effective solution to build network nodes
- Evangelism of modern digital technologies in amateur radio

The Technology

- Node = repeater/node/hot-spot
- Most of nodes has operators call-signs
- Repeater modules:
 - Most sites uses CMX589A-based modems with Fred's firmware
 - Also we have some ICOM RP2C systems
- All nodes uses G4KLX software
 - KI4LKF's OpenG2 and Fred's WinDV in past

Customized ircDDB

Feature	ircDDB.net	ircddb.dstar.su
End-user features		
Allows usage of operators call-signs on nodes	NO	YES
Technological features		
Authentication	LDAP, record per user (4 users per gateway)	SQL with specific data model, record per gateway
Access policy management	Internal	Internal and Policy server
IRC server enhancements	By patches	By plugins

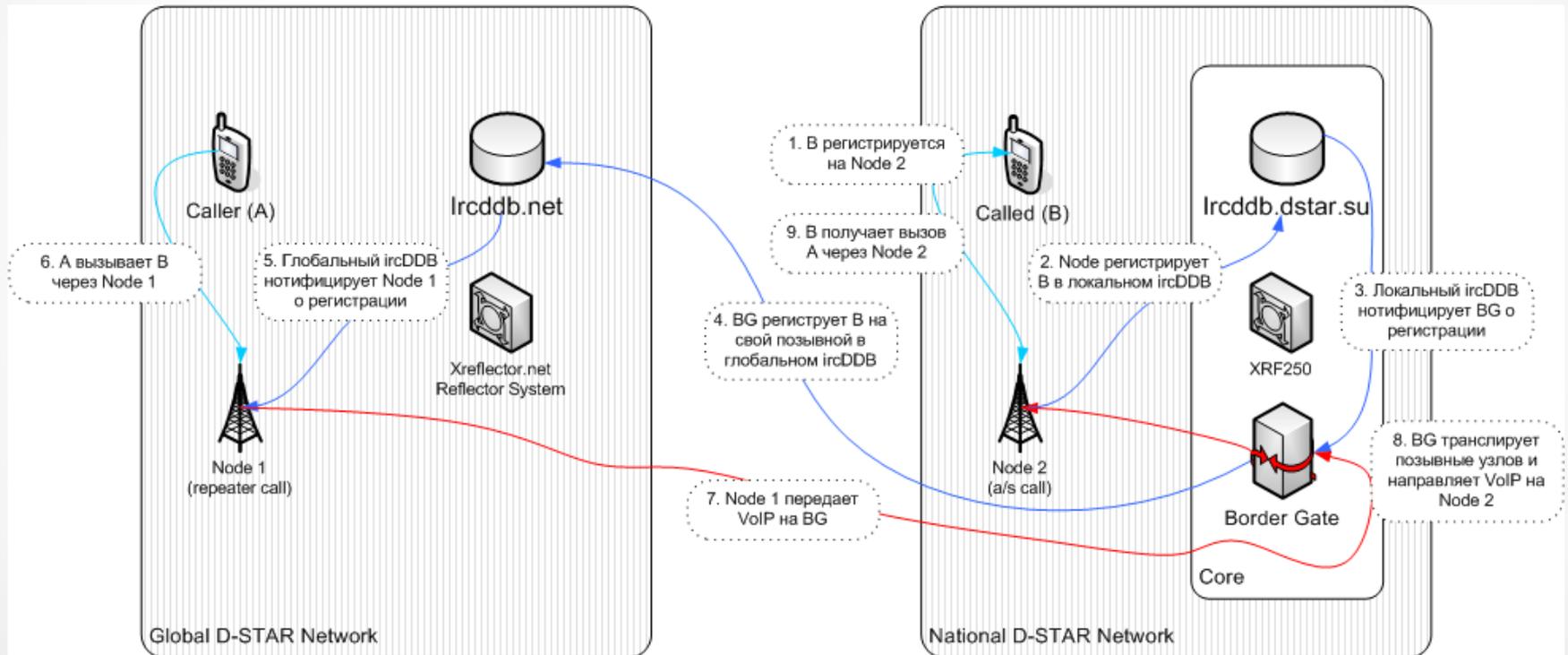
XRF250 reflector

- Based on code of KI4LKF's dxrfd 2.90
- Enhancements for higher security
 - Validation of call sign for operators
 - Validation of call sign and IP for repeaters and dongles
- Both ircDDBs as sources for validation data
 - MySQL with HandlerSocket used as storage
 - Separated daemons provides call-sign synchronization
 - The database library changed to HandlerSocket of MySQL
- The source code published on GitHub
 - <https://github.com/cyanide-burnout/XReflectorPlus>

RK3FWD (Border Gate)

- Original software from R3ABM
- Provides feature of transparent call-sign routing between local ircDDB (D-STAR Russia & CIS) and...
 - ircDDB.net
 - US Trust
 - CCS System
- Trust Server (US Trust) integration are based on ICOM RS-RP2C software
 - RS-RP2C deployed in full compliance with the requirements of US Trust
 - BorderGate software emulates protocol of ICOM ID-RP2C controller fully documented in Japanese D-STAR specification
- Zone calls goes to XRF250B
- The solution has no software limits for count of calls processed simultaneously

Inter-network call routing



The Tracker

- Collects data from:
 - Our local ircDDB, global ircDDB.net
 - XRF250 and DCS002L
 - APRS-IS for CIS call-signs and some special type of stations
 - Signal Monitor (RSSI monitoring)
- Stores data of D-STAR and APRS sites, positions and calls
- Stores conversations from XRF250B in .DVTool files
- Finds correlations between data and makes complete profiles for users, calls and nodes
- Provides data to:
 - Dashboard
 - Last Heard and Call History pages
 - Map
- Provides some additional services:
 - Direct call notification
 - Determination and blocking call-signs that sends periodic beacons to reflector

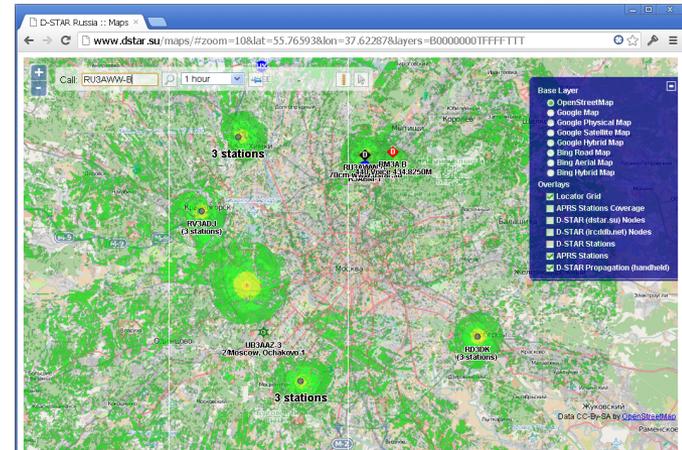
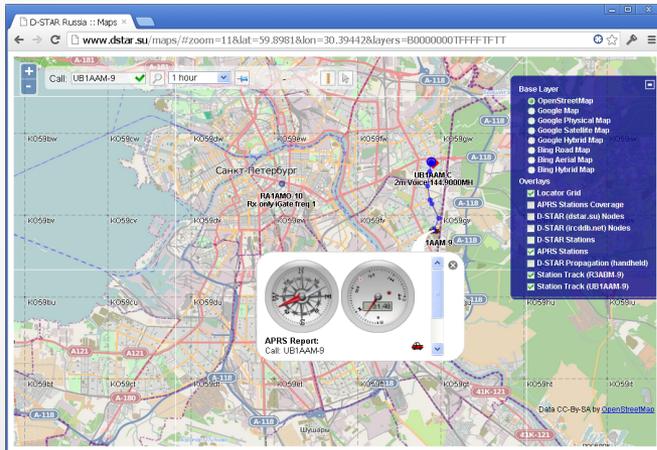
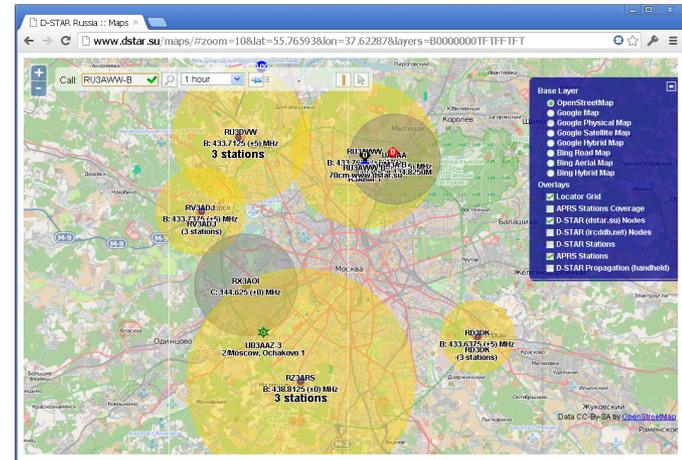
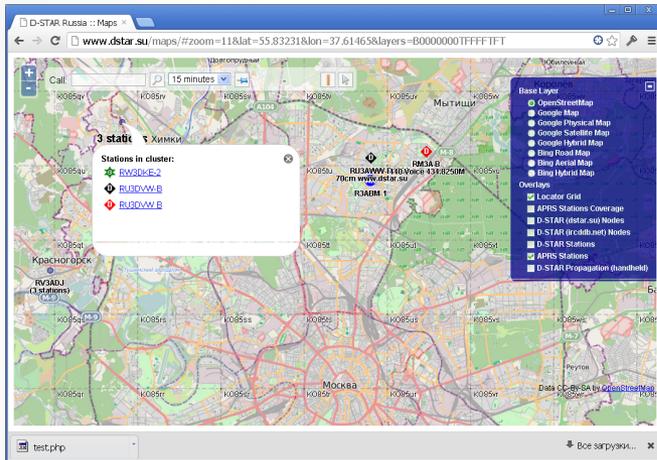
Other services of core

- APRS-IS hub
 - Cluster of geographically-dispersed servers
 - Provides UDP access for UP4DAR project
- AMPR backbone
 - Our presence in AMPR Net (44/8)
 - /20 block in international pool
 - /24 block in Russian national pool
 - SSL VPN service to enable building nodes that ISP connections with private IPs
 - Site-depended blocks for D-STAR DD and possible for HAMNET
 - Plans for deployment of Mobile IP service
 - The service still in development / testing phase

Dashboard

- Nodes list
 - Actual state of each node in ircDDB and XRF250
 - Shows information about nodes from ircDDB
 - Announcements about nodes from forum
 - Filtering by region
- Brand new Last Heard
 - Shows calls from ircDDB and reflector in one list
 - Shows extended call data like APRS call-signs
 - Has hyperlinks to .DVTool files of calls, if available
 - Restrained use of traffic through the use of WebSockets, if possible
- Call history
- APRS hub state
- Downloadable nodes list for ICOM ID-31/ID-51

Interactive Maps



Self-Care

- Single sign-on with forum
- Allows to automatic sign-on to RP2C portal (US Trust)
- Allows to manage:
 - Nodes and hot-spots
 - Call-sign visibility at ircDDB
 - Addressees for Push Service

EchoLink bridge and Internet radio

- EchoLink bridge
 - Makes possible to access reflector XRF250 B without using any specific hardware devices like DV Dongle or DVSI USB3000
 - Shown in EchoLink system as link R3ABM-L
 - Allows access for digital clients (computers, smartphones, tablets, etc.) only
- Internet radio translation of XRF250 B
 - Available at <http://live.dstar.su>

Signal Monitor

- SNR \neq RSSI
- RSSI could be useful for coverage modeling
- Collects data about factual RSSI of each call on the nodes
- Sensors:
 - CAT for home-brew nodes based on transceivers with CAT (FT-8x7, TS-2000...)
 - Analog RSSI sensing using Arduino over Ethernet, USB or serial
 - Analog RSSI sensing using I2C ADC
- Analog sensing available on:
 - ICOM RP2C modular connectors
 - Motorola GM300-series service connectors
 - Demodulators of most VHF/UHF transceivers
- Scale modeling using TCL script
- Available on Windows (Cygwin) and Linux

Participation in other D-STAR projects

- UP4DAR - Universal Platform for Digital Amateur Radio
 - Adapting OS for operating in D-STAR Russia & CIS network
 - Dextra support
 - APRS and NTP
 - Experimental builds

Questions?

