connection to
other IRC servers

Computer **srv1**

IRC server
(e.g. inspircd)

TCP port 9007

LDAP password lookup
(authentication of IRC participants)

local TCP port 389

LDAP server
(e.g. OpenLDAP)

file based LDAP database
generated by shell script from
text file

receive routing updates
from „d-“ users and
distribute them using
the IRC channel
#dstar

IRCDDBApp
(Java program)
IRC nickname: **s-srv1**

in-memory routing
database

backup file „db.txt“
written every 5 minutes

send new
routing
information to
one IRC user
whose nickname
starts with „s-“

DsmApp
(Java program)
IRC nickname: **d-srv1**

„select from LastHeard“
every 10 seconds

PostgreSQL
database

TCP port 5432

database connection is
password protected

client-initiated TCP connection
using the protocol defined
in RFC2812

DSTAR repeater **TE0ST**

ICOM repeater
controller

RF
module

eth1

Gateway
Computer

RptrApp
(Java program)
IRC nicknames: **te0st-1,**
te0st-2, te0st-3,
or **te0st-4**

capture ethernet
packets

update table „sync_mng“
fields „arearp_cs“ and
„zonerp_cs“
update table „sync_gip“
field „zonerp_ipaddr“

PostgreSQL
database

ICOM software
dsipsvd

USTRUST

ICOM software
dsipsvd

DStarMonitor
(Java program)
by AE5PL

additional output channel configured
in dstarmonitor.properties

update LastHeard table

update LastHeard table

www.dstarusers.org

mySQL
database

web server

software already
installed

DL1BFF - 2010-05-24

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IRC channel (monitored with client software „irssi“)

```
12:24 <@s-srv1> 2010-05-22 10:24:01 DL1XXX__ DB0XYZ_B  (from: d-srv1)
12:31 <@s-srv1> 2010-05-22 10:31:29 DL2XXX__ DB0XYZ_B  (from: d-srv1)
12:36 <@s-srv1> 2010-05-22 10:36:31 DK0XYZ__ DB0XYZ_B  (from: d-srv1)
12:45 -!- te0st-4 [te0st@80.116.64.236] has joined #dstar
12:46 -!- te0st-3 [te0st@80.116.124.47] has quit [Ping timeout: 121 seconds]
12:49 <@s-srv1> 2010-05-22 10:48:58 DL3XXX__ DB0ZYX_B  (from: d-srv1)
 [13:00] [@u-dl1bff(+i)] [5:#dstar(+mnt)]
[#dstar]
```

Only the „target_cs“ and „arearp_cs“ are reported over the IRC channel. The software looks for the corresponding „zonerp_cs“ in table „sync_mng“. If it doesn't find it there, the repeater cannot contact the remote module. In this case, the special value „NOCALL99“ is put in the „zonerp_cs“ field.

new table: **sync_mng_external**

target_cs	last_mod_time	arearp_cs	zonerp_cs
DL1XXX	2010-05-22 10:24:01	DB0XYZ B	DB0XYZ
DL2XXX	2010-05-22 10:31:29	DB0XYZ B	DB0XYZ
DK0XYZ	2010-05-22 10:36:31	DB0XYZ B	DB0XYZ
DL3XXX	2010-05-22 10:48:58	DB0ZYX B	NOCALL99

incoming „insert“ statement from USTRUST via „dsipsvd“ with out-of-date routing information:

```
insert into sync_mng values('DL2XXX  ','2010-05-22 08:30:15',
      now(),now(),'dl2xxx','DB0XYZ C','DB0XYZ  ',
           'DL2XXX  ','DB0XYZ  ','10.40.181.88','f')
```

Every „insert“ or „update“ to the table „sync_mng“ will be checked by the trigger function. If there is data available in table „sync_mng_external“ with a more recent timestamp then the newer (and better) data is used.

PostgreSQL trigger
trigger_sync_mng_ext

```
CREATE OR REPLACE FUNCTION process_sync_mng_external() RETURNS TRIGGER AS $$
    DECLARE
        ext_data  sync_mng_external%ROWTYPE;
    BEGIN
        SELECT * INTO ext_data FROM sync_mng_external
                                    WHERE target_cs = NEW.target_cs;
        IF NOT FOUND THEN
            RETURN NEW;
        END IF;

        IF ( NEW.last_mod_time < ext_data.last_mod_time )
                    AND NOT ( ext_data.zonerp_cs = 'NOCALL99' ) THEN
                NEW.arearp_cs     := ext_data.arearp_cs;
                NEW.zonerp_cs     := ext_data.zonerp_cs;
        END IF;
        RETURN NEW;
    END;
$$ LANGUAGE plpgsql;

CREATE TRIGGER trigger_sync_mng_ext
 BEFORE INSERT OR UPDATE ON sync_mng
 FOR EACH ROW EXECUTE PROCEDURE process_sync_mng_external();
```

existing table: **sync_mng**

target_cs	last_mod_time	..	..	..	arearp_cs	zonerp_cs	..	..	..	..
DL1XXX	2010-05-22 07:21:01	..	..	..	DB0XYZ B	DB0XYZ	..	..	..	..
DL2XXX	2010-05-22 08:30:15	..	..	..	DB0XYZ B	DB0XYZ	..	..	..	..
DK0XYZ	2010-05-21 19:36:31	..	..	..	DB0XYZ B	DB0XYZ	..	..	..	..

DL1BFF - 2010-05-27

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IRC channel (monitored with client software „irssi“)

```
12:24 <@s-srv1> 2010-05-22 10:24:01 DL1XXX__ DB0XYZ_B  (from: d-srv1)
12:31 <@s-srv1> 2010-05-22 10:31:29 DL2XXX__ DB0XYZ_B  (from: d-srv1)
12:36 <@s-srv1> 2010-05-22 10:36:31 DK0XYZ__ DB0XYZ_B  (from: d-srv1)
12:45 -!- te0st-4 [te0st@80.116.64.236] has joined #dstar
12:46 -!- te0st-3 [te0st@80.116.124.47] has quit [Ping timeout: 121 seconds]
12:49 <@s-srv1> 2010-05-22 10:48:58 DL3XXX__ DB0ZYX_B  (from: d-srv1)
 [13:00] [@u-dl1bff(+i)] [5:#dstar(+mnt)]
[#dstar]
```

Every IRC client sends a „PING“ command to the IRC server every 30 seconds. The IRC server has to respond to this command with a „PONG“ answer. If this „PONG“ is not received within 30 seconds, the client closes the connection and tries to connect to the server again. If the client changes its IP address this „PING-PONG“ communication fails and results in a new connection to the IRC server within 1 minute.

The IRC server also sends „PING“ commands. After 2 minutes, the server closes the old connection.

```
12:45 -!- te0st-4 [te0st@80.116.64.236] has joined #dstar
```

IRC channel nickname is converted to capital letters

the „host“ part of the IRC server login message is the IP address of the repeater

```
update sync_gip set zonerp_ipaddr='80.116.64.236' where zonerp_cs='TE0ST   '
```

existing table: **sync_gip**

zonerp_cs	last_mod_time	..	..	zonerp_ipaddr	..
SZ1XX	2009-12-08 15:06:09	..	..	91.238.227.120	..
TE0ST	2010-05-01 10:24:01	..	..	80.116.64.236	..
VA2RXX	2009-11-11 17:40:27	..	..	74.215.0.34	..

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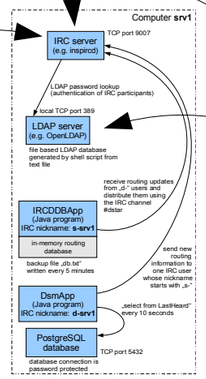
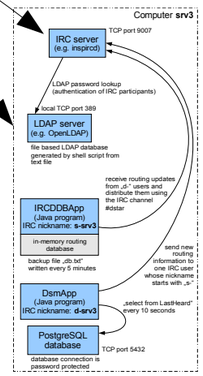
server-to-server IRC
protocol defined in RFC2813

DNS: server-group-1.example.com.
198.51.100.1
203.0.113.2



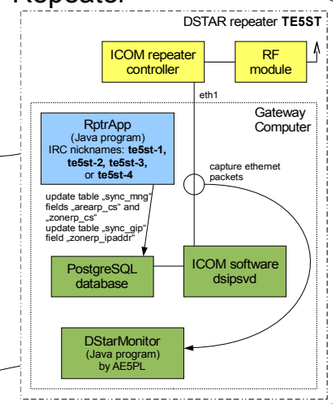
198.51.100.1



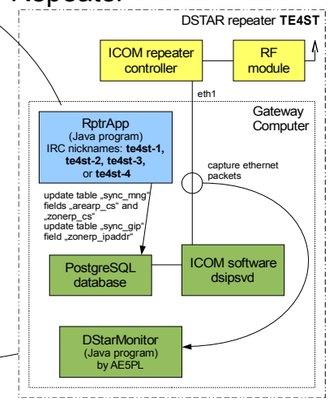
203.0.113.2

server group 1

Repeater



Repeater



select IRC server IP address
and PostgresQL server IP
address with DNS round robin

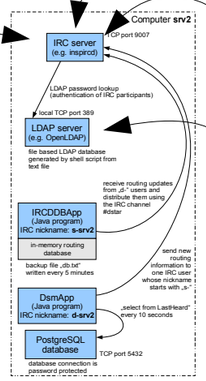
server-to-server
IRC protocol
defined in
RFC2813

user account information has to
be synchronized within a server group

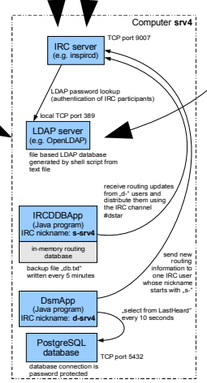
server group 2

(there should be
more than one
connection between
groups of servers)

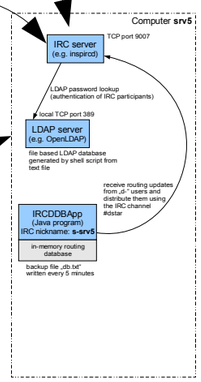
DNS: server-group-2-irc.example.com.
203.0.113.150
198.51.100.213
192.0.2.17



203.0.113.150



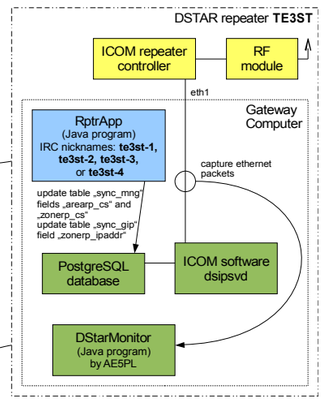
198.51.100.213



192.0.2.17

select IRC server IP address
and PostgresQL server IP
address with DNS round robin
<u>separately</u>

Repeater



DNS: server-group-2-postgres.example.com.
203.0.113.150
198.51.100.213

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