PRIDE Progress Report

February - May, 1994

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1. Management Summary

During the reporting period two major milestones were reached: The PRIDE Guide 1 was released and the PRIDE Course 1 was completed. The first course has been held and was received very well. Also two revisions of the PRIDE Tools 1 have been released. These include the new tool prpath.

The guide and course milestones were reached later than planned. This is caused partly by the slower start of the project as reported earlier and partly by the need to accommodate classless inter-domain routing (CIDR) in the project. Since CIDR influences routing policy, the routing registry needs to be adapted for it. Considerable unforeseen effort of the project team has gone into speeding up revision of the routing registry specification. We decided to do this because it would be useless to continue developing tools for a classful registry.

US NSF sponsored efforts in the RR area were also starting during this period. Coordination with these also needed some unforeseen resources. Fortunately the NSF sponsored "Routing Arbiter" decided to base its routing registry on the RIPE/PRIDE software. This is an important step towards a globally compatible system of RRs.

Due to these developments the project plan has been revised. The project will be extended with two months recovering the 4 FTE months lost in 1993. We now plan to provide the originally planned tools with exception of "prconn" in their classless versions as well as incorporate the classless routing registry into the PRIDE guide 2 and PRIDE course 2.

2. The CIDR Challenge

The deployment of classless inter-domain routing (CIDR) in the Internet has now started in earnest. More and more classless routes are being originated into the Internet routing mesh. Aggregate routes can potentially summarise routing information which was previously used to make policy decisions with a finer granularity. This has immediate consequences for the routing registry as well as the tools based on it. The ripe-81 based routing registry needs to be enhanced.

Unfortunately, the need to accommodate classless routing as well as its impact on the routing registry and tools were not foreseen during the definition of the PRIDE project. Consequently the work plan needs to be adapted as described below. As an immediate measure we have postponed further development of tools and helped substantially with the revision of the routing registry itself.

3. Routing Registry Changes

During the reporting period the RIPE routing group has taken up the challenge to adapt the RIPE routing registry to classless routing. The PRIDE project team has provided substantial support for this effort which resulted in a draft routing registry specification ("ripe-81++") presented at the 18th RIPE meeting.

At the same time Merit Inc. have started their routing registry activities based on ripe-81. As a basis for their initial routing registry implementation Merit used the RIPE routing registry software. The PRIDE team gave significant support in helping Merit to establish its routing registry. It is expected that this registry will be used by the "Routing Arbiter" sponsored by the US National Science Foundation. We understand that the registry function of the "Routing Arbiter" will be provided to all North American service providers independently of whether they attach to the NSF sponsored NAPs or not.

In order to achieve a globally compatible routing registry, Merit have been invited to participate in the ripe-81++ discussions of the RIPE routing group with the aim to arrive at one RR specification both for the RIPE RR and the Merit RR. This is a significant step towards global compatibility of routing registries in the Internet.

During the 18th RIPE meeting all the extensions were discussed at length and a draft RR specification is expected to be agreed in early July. The current draft can be found as:

`ftp.ripe.net:ripe/drafts/ripe-81++.{ps,txt}`

A presentation of the extensions given at the ripe meeting can be found as::

`ftp.ripe.net:ripe/presentations/ripe-m18-tony-RIPE81++.ps.Z`

4. PRIDE Activities

4.1. PRIDE Tools 1 Release

Two releases were made during this period, pride-tools-1.0.3 and pride-tools-1.0.4. The most significant additions to the tools was the first release of prpath. Prpath was in alpha test for quite some time. The reaction to prpath has been very good with only minor changes needed The "-g" flag was also added to prtraceroute. This allows prtraceroute to take advantage of the traceroute gateway function with IP Loose Source Record Routes especially useful for checking symmetry of policy.

The current tools release is available from:

`ftp.ripe.net:pride/tools/pride-tools-1.0.4.tar.Z`

Besides the complete package, each tool is also available separately in this directory. Preliminary work has begun on a number of new modules for the tools in the form of a set of general library routines. This is still in its early stages but this is expected to be significant part of the second release of the tools package.

The reaction for the tools continues to be very positive. Table 1 details the current usage statistics of the tools and the interactive PRIDE menu. The following statistics are taken from the period of February 1st - May 31st, 1994. It should be noted that this is a larger reporting period than in previous reports.

Tool	Ftp'd S/W(1)	whois queries(2)	Menu Usage
Prcheck	27	695	92
Prtraceroute	79	16399	348
Prpath(5)	3	342	5
Full Package(3)	197		249(4)

(1) Amount of anonymous ftp transfers of the software

(2) No. of RR queries related to the tools. The average amount for each tools is for prcheck, 5 and for prtraceroute and prpath, 10.

(3) Means the full release package.

(4) Total number of calls to the menu.

(5) Prpath was only released in the month of May.

Table 1: Statistics for PRIDE-TOOLS-1

From this we see an increase in the amount of sites pulling the software with a decrease in the amount of queries to the RR itself from the tools. This is an indication that more sites are running there own versions of the RR software locally.

4.2. PRIDE GUIDE 1 (PRIDE-3)

The first PRIDE guide was released as a draft in week 13. It followed the structure outlined in report 3. The first official guide was ready in time to be used as part of the first PRIDE course (see below). The guide is now available from

ftp.ripe.net:pride/docs/guide-1.0.ps.tar.Z
ftp.ripe.net:pride/docs/guide-1.0.txt.tar.Z

This distribution includes a small script to make and print the document correctly. The guide is currently some 130 pages. The postscript version of the guide is the preferred format because it includes many graphics which are not available in the text only version.

4.3. PRIDE COURSE 1 (PRIDE-4)

The first PRIDE course was held May 31st in Amsterdam. In order to provide room for discussion and useful feedback from the attendees attendance had been restricted to 12. Some of those interested had to be turned down and only one person from each organisation could participate. The majority of participants came from service providers, half of those from R&D providers.

The general structure of this one day, four session course roughly follows the PRIDE Guide:

Morning

1. Basics and Principles of Policy Based Routing
2. Routing Registry Principles and the RIPE RR

Afternoon

3. Using the RIPE RR and the PRIDE Tools
4. Future Developments (CIDR, ...)

The material for each attendee consists of a slidebook containing a copy of the slides with room for notes, a reader containing ripe-81 and its successor in draft form as well as a copy of the PRIDE guide. The material is currently available on request only.

We decided to present a fair amount of basic material which should be known to participants at least to some extent. The intention of this is to create a common basis and terminology to explain the RR and the tools.

After each session and at the conclusion of the course each attendee was asked to complete a questionnaire, an example of which can be found in Appendix G. The average results are presented below:

	Sessions				Whole
	S1	S2	S3	S4	Course
% of material known	87	79	42	38	61
% of known material useful	79	81	90	71	88
% of new material useful	97	97	100	89	94
% of material understandable	95	94	98	85	91
satisfaction with slides	89	95	97	90	91
satisfaction with presentations	88	83	92	92	93
overall quality	88	91	91	91	91

Table 2: Results of PRIDE course questionnaire

From the answers to the "% of known material useful" question it can be seen, that our approach which repeats some known material is well received. We are quite pleased with the results of the "overall quality" question. An average overall satisfaction of around 90% on the first edition of a course is not a bad result at all. Consequently we will not change the general structure of the PRIDE course version 1. Based on the comments from the attendees we will make some slight adjustments to sessions 2 and 3, introducing more examples and step-by-step walk-throughs into session 3.

A second course will be held in July, location and date to be determined by user demand.

5. Revised Work Plan

Because of the unexpected work on ripe-81++ and the impact of classless routing on the tools the workplan of PRIDE has been changed. Most noteworthy the project duration will be extended with two months until week 44/94. This has no budgetary consequences because we still have 4 unused FTE/months from 1993. Because of the delays inherent in the ripe-81 revision process an extension is more appropriate than adding additional resources to the project earlier.

The revised workplan is now as follows:

Milestones	Work
Week 25	finalise ripe-81++ draft
Week 27	complete RR software changes for classless
	revised course-1 material
Week 28	hold another course-1
Week 29	beta-release classless tools-1
Week 31	ripe-81++ accepted by RIPE routing group
Week 36	release guide-2
	beta release prconfig
Week 37	present work at RIPE 19
Week 38	tools-2 release (including prconfig)
Week 40	course-2 release
Week 41	hold courses
Week 42	hold courses
Week 43	hold courses
Week 44	final report

Table 3: Revised work plan

6. Progress Against Milestones

PRIDE-2 (PRIDE-TOOLS-1) was completed in week 50/93.

PRIDE-3 (PRIDE-GUIDE-1) was completed in week 22.

PRIDE-4 (PRIDE-COURSE-1) was completed in week 22.

7. Appendices

The list of appendices are a regular part of the monthly reports. They are expected to grow as the project evolves.

Appendix A — PRIDE documents

This contains the list of PRIDE documents.

The PRIDE project proposal:

ftp.ripe.net:pride/docs/pride-prop.{ps,txt}

PRIDE Guide (PRIDE-3).

ftp.ripe.net:pride/docs/guide-1.0.tar.txt.Z
ftp.ripe.net:pride/docs/guide-1.0.tar.ps.Z

Appendix B — Related documents

This contains a list of all PRIDE related documents.

RIPE Routing Registry format - RIPE 81

ftp.ripe.net:ripe/docs/ripe-docs/ripe-081.ps

RIPE-81++

ftp.ripe.net:ripe/drafts/ripe-81++.ps

Proposed RR syntax from Merit

rrdb.merit.edu:pub/meritrr/policy_syntax.txt

Guarded Field Support in the RIPE database - RIPE 108

ftp.ripe.net:ripe/docs/ripe-docs/ripe-108.ps

SWIP proposal

merit.edu:/pub/nsfnet/swip/swip.txt

Appendix C — PRIDE tools

PRIDE-1 (First release of PRIDE-tools 1)

ftp.ripe.net:pride/tools/pride-tools-1.tar.Z

The pride ftp directory contains the following directories:

tools
    PRIDE tools and related software

reports
    PRIDE monthly project reports

docs
    PRIDE and related documents

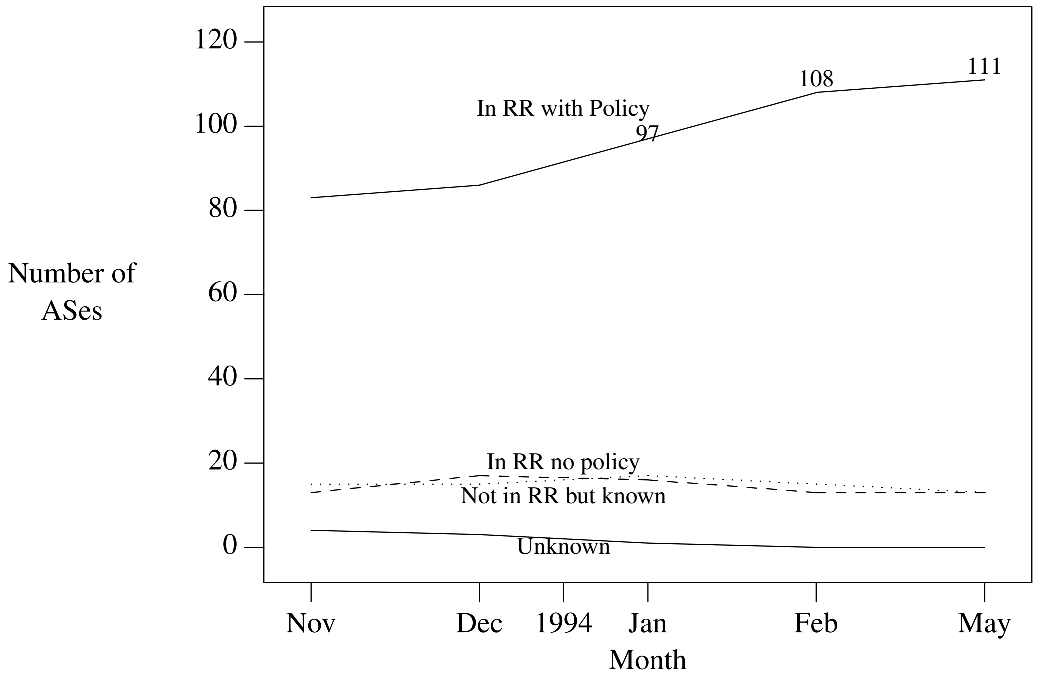
Appendix D — Routing Registry (RR) Status

State: May 1994

Status of European ASes in RR	# of ASes	Percentage
In RIPE database with Routing Policy information	111	82 %
In RIPE database without Routing Policy information	13	10 %
Not in RIPE database but in NIC/related databases	12	8 %
Total	136	

Table 4: Breakdown of known European routed ASes

The graph below shows the growth rate of the routing registry since the beginning of the PRIDE project.



It should be noted the the Month scale is not linear. This graph is also based on routed ASes in the routing registry. The actual number of ASes did not increase much between February and May. However, this is in part due some re-engineering of ASes in Europe so some of the ASes also disappeared in this period.

Status of Worldwide ASes in RIPE RR	# of ASes	Percentage
In RIPE database with Routing Policy information	111	29 %
Non-Euro ASes in RIPE Database with RP info	2	1 %
In RIPE database without Routing Policy information	13	3 %
Non-Euro known without Routing Policy information	251	66 %
Unknown in any database	5	1 %
Total	382	

Table 5: Breakdown of known Worldwide routed ASes

Appendix E — Example usage of Interactive menu

% **telnet info.ripe.net 4711**

```
Trying 192.87.45.1 ...
Connected to ns.ripe.net.
Escape character is '^]'
                 PRIDE Tools Server

     1 - prcheck
         This tool checks syntax and consistency of AS objects
         in RIPE-81 format. These objects describe routing
         policy and jointly form the RIPE Routing Registry.
         The server version can only check objects already in
         the database. If you install prcheck locally you can
         use it to check local objects (before submitting them)
         as well. You can also find out if your routing policy is
         consistent with those of your neighbors.

     2 - prtraceroute
         This tool combines the normal traceroute output with
         routing policy information from the RIPE Routing
         registry. The output clearly identifies routing problems.
         The server version can only trace routes from host
         ns.ripe.net.If you install prtraceroute locally you can
         also trace from your host.

     3 - prpath
         This tool will display all possible paths according to
         the routing policy information registered in the RIPE
         routing registry between a certain source and destination.

     q - Quit

Enter Selection: 2

This server version will display a quite verbose
version of the prtraceroute output. The argument
to enter is a destination domain name or IP address.
The route from ns.ripe.net to the destination will
be displayed.
```

Enter destination host []: **ns0.ja.net**

```
doing prtraceroute -l -v ns0.ja.net

traceroute with AS and policy additions [Jan  4 14:02:47 UTC]

                from AS1104 ns.ripe.net (192.87.45.1)
```

```
                to   AS 786 ns0.ja.net (193.63.94.20)

 1 AS1104  hef-router.nikhef.nl           (192.87.45.80)      [I] 2 3 2 ms
 2 AS1103  Amsterdam1.router.surfnet.nl   (192.16.183.112)    [D1] 2 2 2 ms
 3 AS1103  Amsterdam2.router.surfnet.nl   (145.41.9.130)      [I] 5 3 4 ms
 4 AS2043  amsterdam4.empb.net            (193.172.4.17)      [E1] 6 7 5 ms
 5 AS2043  london1.empb.net               (193.172.4.5)       [I] 22 23 27 ms
 6 AS 786  int-gw.ulcc.ac.uk              (193.172.27.14)     [E1] 24 26 33 ms
 7 AS 786  ns0.ja.net                     (193.63.94.20)      [I] 45 24 56 ms

AS Path followed:  1104 1103 2043 786

AS1104 = NIKHEF-H
AS1103 = SURFnet IP
AS2043 = European Multiprotocol Backbone
AS 786 = The JANET IP Service

done.
Enter Selection: q
Goodbye
Connection closed by foreign host.
```

Appendix F — Example course questionnaire

Questionnaire

Dear PRIDE course attendee,

the PRIDE team would like your feedback on the usefulness of the PRIDE course to you. Please take a few minutes to answer the seven questions below. We would like to know who the comments come from as well, so we can maybe discuss some details with you later via electronic mail. This will help us to improve the course.

We are measuring the usefulness of the course and not your intelligence, aptitude or level of sleepiness today!

Name:

Session: **`Whole course`**

Answers to the following questions are on a percentage scale with five possible answers. Please circle the closest answer.

1. How much of the material presented was already known to you?
`(100%=I knew everything before, 0%=everything was new)`

    `0%      25%     50%     75%     100%`

2. If you consider the material you already knew before; how much of it was useful to you in this course, because it refreshed your memory or was presented in a new way?
`(100%=all repeated material was useful, 0%=no repeated material was useful)`

    `0%   25%     50%     75%     100%`

3. If you consider the material that was new for you; how much of it was useful to you?
   `(100%=all new material was useful, 0%=no new material was useful)`

   `0%   25%     50%     75%     100%`

4. If you consider all material presented; how much of it was presented in a way that was understandable to you?
   `(100%=everything was clear, 0%=all was totally obscure)`

   `0%   25%     50%     75%     100%`

5. How much were you satisfied with the quality of the slides ?
   `(100%=fully satisfied, can't be done better, 0%=slides were rubbish)`

   `0%   25%     50%     75%     100%`

6. How much were you satisfied with the quality of the presentation?
   `(100%=fully satisfied, can't be done better, 0%=unintelligible presentation)`

   `0%   25%     50%     75%     100%`

7. How much were you satisfied whit the overall quality of the course ?

   `0%   25%     50%     75%     100%`

Thank you for your help.

The PRIDE Team