# Internet Resource Certification

## Enhanced IP Resource Registration

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Qatar Regional Meeting, November 2007

# Agenda

- Context

- Resource certificates

- Work underway in this area

- RIPE NCC efforts

- Next steps

- Conclusions and questions

# Context

*Several drivers for enhancements in the Internet resource distribution system*

- Impending exhaustion of the free pool of IPv4 address space

- Increase in transfers of resources

- Address and routing security

- Pressure to maintain data quality and provide enhanced resource registration

- The functionality and integrity of the Internet as a services platform

- Capability of sustained growth

# Impending exhaustion of the free pool of IPv4 address space
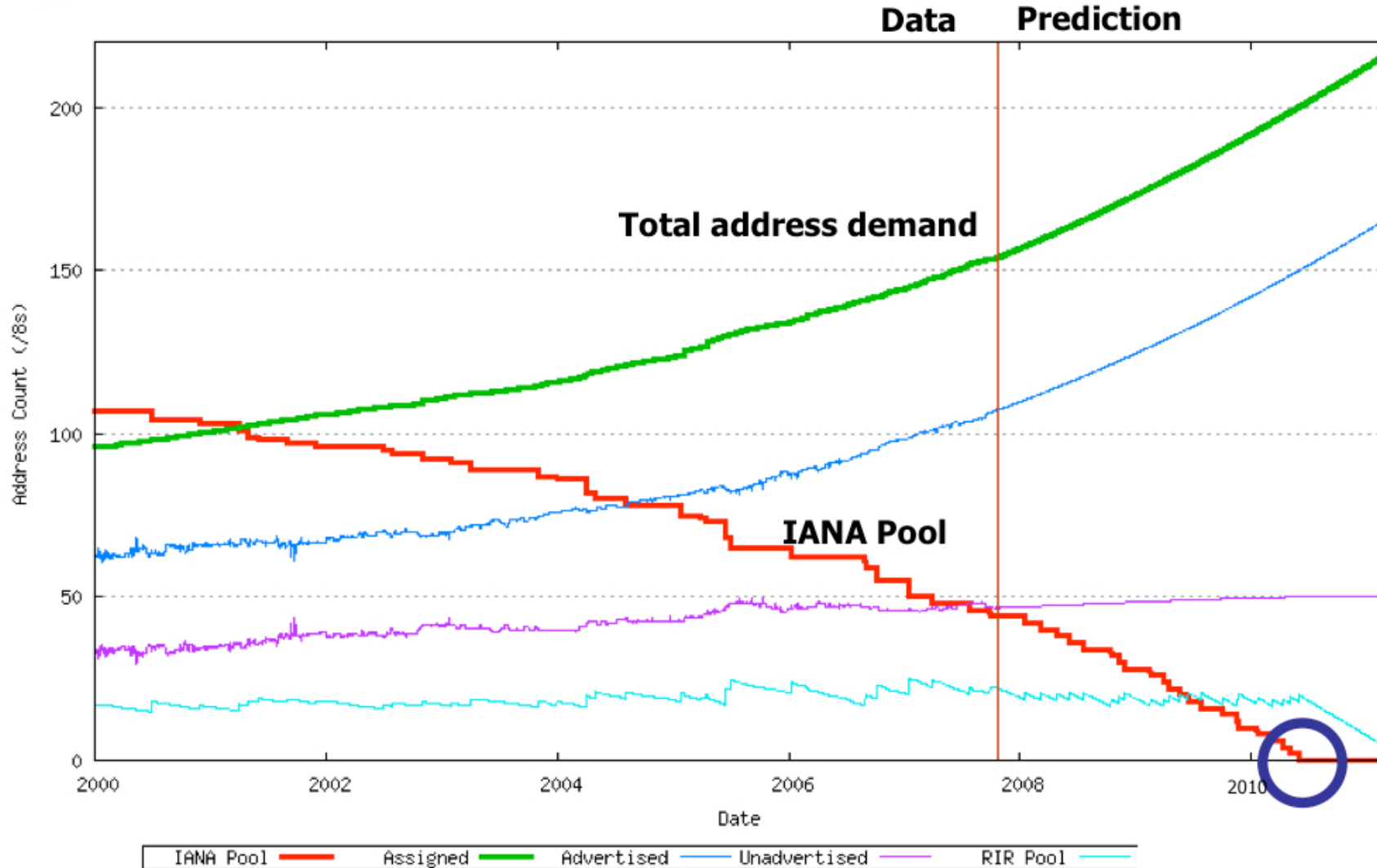
**Current distribution of IPv4 address space:**



16% available

source: http://potaroo.net
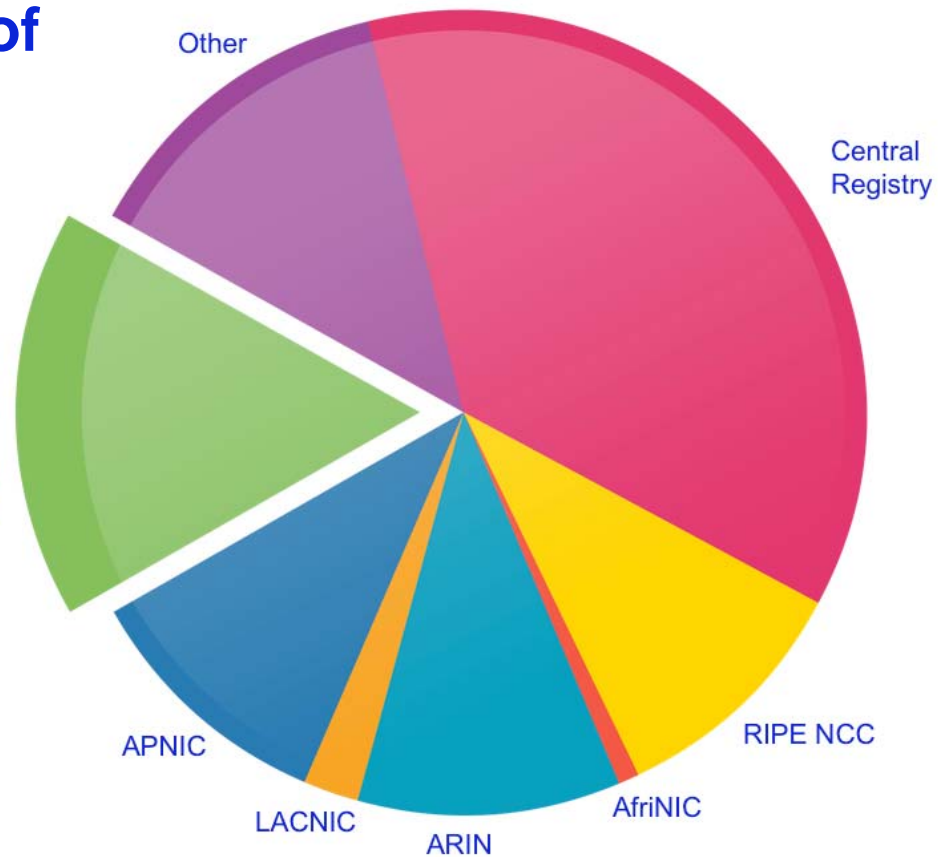
# Impending exhaustion of the free pool of IPv4 address space

# IPv4: the current situation

- No straight forward solution/replacement

- IPv4 addresses will continue to be in demand far beyond the date of exhaustion of the unallocated pool

- In the transition (to IPv6) environment, all new and expanding network deployments will need IPv4 service access and addresses for as long as we are in this dual track transition

# Transfer of resources

- Sooner or later, we'll run out of IPv4 addresses
  - RIRs will have to say no to requests for new addresses
  - Not every network will be IPv6 ready at this point
  - There will still be a demand for IPv4

- Solution: See if one can get IPv4 from someone other than an RIR!
  - Some may no longer need their IPv4 addresses
  - Buy or borrow, but don't steal

- A system for securely transferring resources is required

- This system can be based on policies developed and agreed on by the community

# Address and routing security

- ## Basic security questions
  - Is this a valid prefix?
  - Who injected it into the network?
  - Is the person who did this authorised to do this?
  - Is the forwarding path acceptable?
  - Can I trust my peer to deliver accurate information?

- ## Answers have to be
  - Reliable
  - Fast
  - Cheap

- ## Potential technologies
  - *Improved* Internet Routing Registries
  - DNS/DNSSEC
  - Resource certificates
  - …

# Data quality and enhanced resource registration

- Data quality is increasingly important in this new environment

- RIPE NCC involved in several projects to ensure data quality

  - PI policy proposal

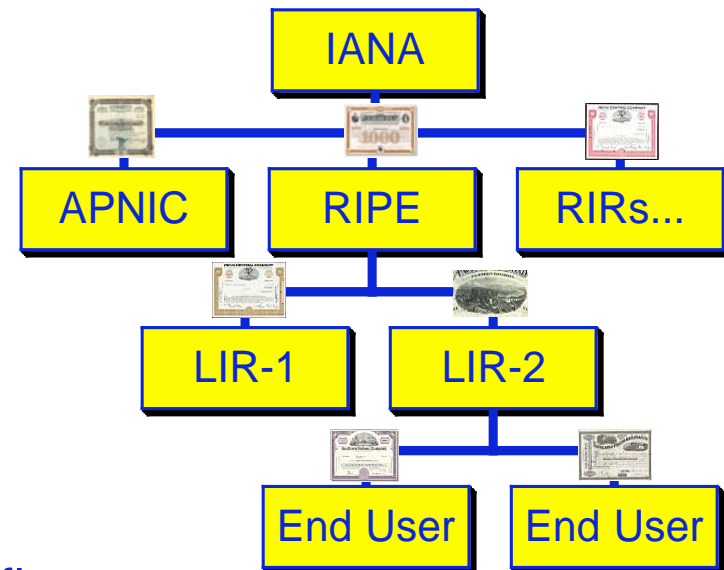  - Reclamation projects on pending closure LIRs

  - Certification

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# Resource certificates

- ## What is a certificate?
  - Structured file with information
  - Signed with a private key
  - X.509 is the standard

- ## Properties
  - Valid for a certain period
  - Can be revoked
  - Allows for generating subordinate certificates
  - Validity can be checked by walking backwards to the root

- ## Not that simple:
  - More than technology
  - Also policy, organisational, procedural and legal aspects
  - Should fit into the existing frameworks

IANA

APNIC    RIPE    RIRs...

LIR-1    LIR-2

End User    End User

# Benefits of certification

- Support automated provisioning

- Support transparent and secure resource transfer mechanism

- Support secure routing initiatives

- Enhance resource registration processes

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# Work underway in this area

- SIDR-WG/IETF
  - Working group to formulate a standard architecture for a secure inter-domain routing security framework

- ResCert/Inter-RIR coordination
  - Provide a common system across RIRs, discuss common issues amongst RIRs

- Activities at ARIN and APNIC

- RIPE Certification Task Force
  - Provide guidance to the RIPE NCC from an LIR's perspective
  - Act as a sounding board for the RIPE NCC during execution of the project

- RIPE NCC
  - Execution of the actual certification project
  - Evaluate the consequences for the NCC operations and systems

# RIPE Certification Task Force (CA-TF)

- Task force assembled at RIPE 53

- Six RIPE community members

- Representation from throughout the region

- Set-up to be part of the trial deployment in the RIPE region during 2007-2008

- Tasked to formulate a report for RIPE 56, as part of community discussion on the way forward

# Certification TF scope

- Identify requirements for a number resource certification service

- Follow developments and raise awareness among network operators

- Advise on impact

- Provide recommendations for production development

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# RIPE NCC efforts (1)

- ## 2004-2005

  - Read up

  - Attend workshops / BOFs, followed mailing lists

- ## 2006

  - Initial studies

  - Understand technology

  - Introduce this to RIPE community:

    - CA Task Force for community input

# RIPE NCC efforts (2)

- ## 2007

  - CA-TF 1 discussed high level focus areas (Q1 2007)

  - Prototype (back-end) was successfully deployed (Q1-Q2 2007)

  - Report @ RIPE 54 (addressed issues)

  - Progress on community level: policy area - concrete proposal and viewpoints (Q3 2007)

  - RIR-wide effort in the technical and application area result:

    - Understanding that differences in RIR operations mean that RIRs will have to implement specifics themselves

  - **Started development of a 0.8 production version, with the goal of validating community requirements**

# Current status

- Defined a picture of the landscape

- A first Certification prototype has been delivered supporting the identification of impacted areas

- Five main areas will be the focus of research and discussion and execution of a preliminary implementation:
  - **Business area (including impact on policies)**
  - **Services area**
  - **Technical area**
  - **RIR wide area**
  - **Application area**

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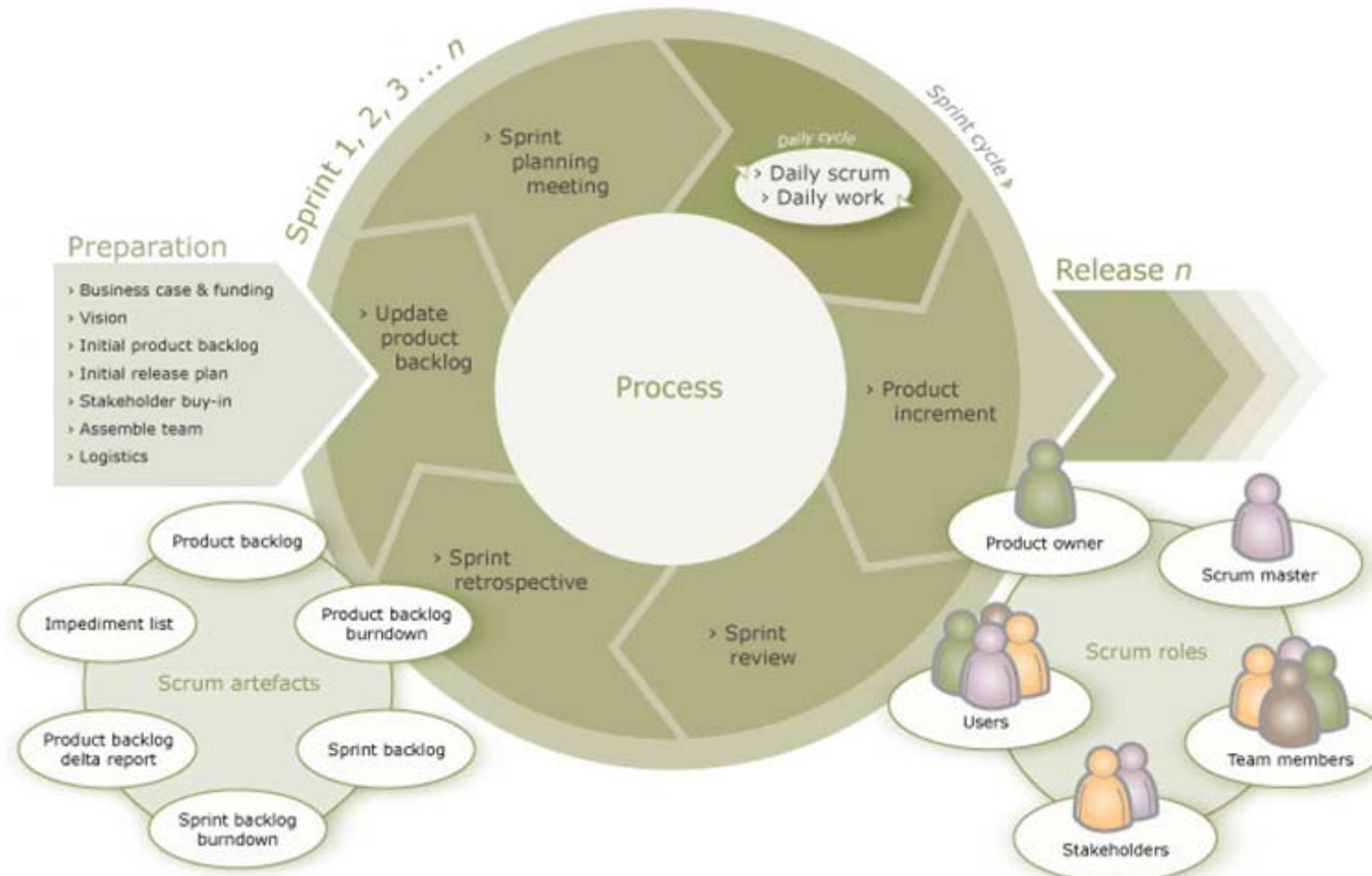- Next steps

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# Next steps

- Moving towards an actual certification service offered by the RIPE NCC to members (0.8 version)

- Deliverables:

  - Produce a system that supports all operations needed by a future RIPE NCC certification service

    - Hardware

    - Software

    - Documentation (both technical and user)

  - Produce components that can be used by the community

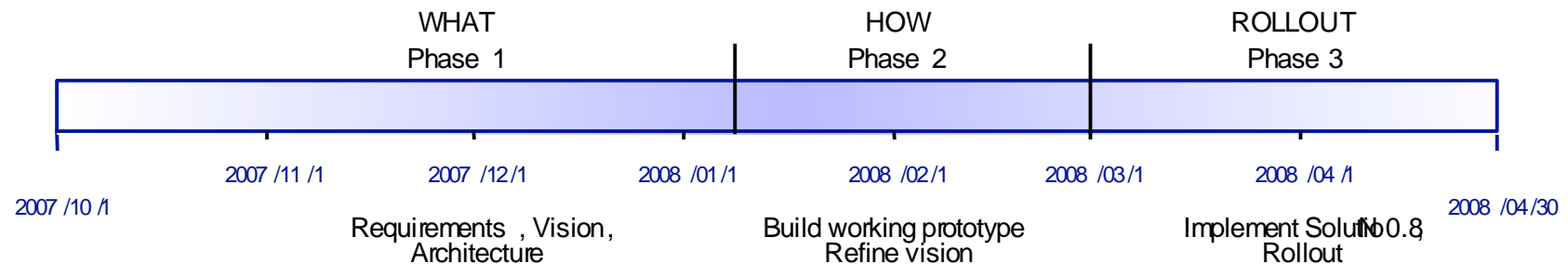  - Draft proposals for new or modified policies

# Project approach

# Preliminary Timeline

| | WHAT | HOW | ROLLOUT |
|---|---|---|---|
| | Phase 1 | Phase 2 | Phase 3 |

2007 /10 /1   2007 /11 /1   2007 /12 /1   2008 /01 /1   2008 /02 /1   2008 /03 /1   2008 /04 /1   2008 /04 /30

Requirements , Vision, Architecture

Build working prototype Refine vision

Implement Solution 0.8 Rollout

## Key dates

– 01.02.2008 – Demo results of assignment 1 for task force
– 01.04.2008 – Version 0.8 deployment for review by task force
– 01.05.2008 – Report @ RIPE 56

# Pointers and URLs

- ## SIDR WG

  - http://www.ietf.org/html.charters/sidr-charter.html

  - 6 architecture documents

  - Read and comment!

- ## RESCERT:

  - http://mirin.apnic.net/resourcecerts/wiki/index.php

  - Information repository

- ## CA-TF

  - http://www.ripe.net/ripe/tf/certification

  - Public website of closed group

# Conclusions

- New trends in the industry may require certification of resources

- RIRs have to be ready to issue certificates

- RIPE NCC is on its way to providing this service

# Questions?