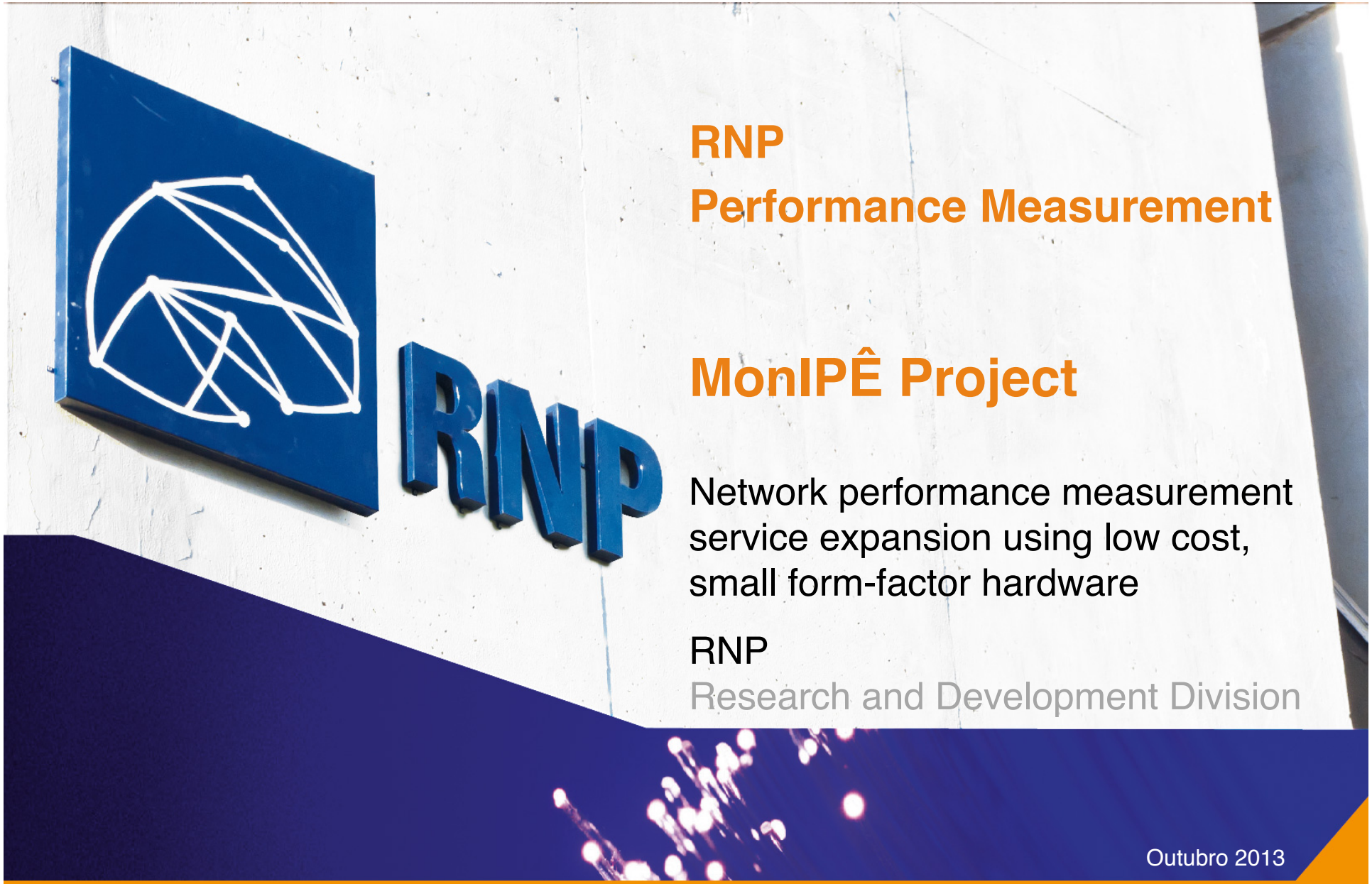

RNP
Performance Measurement

MonIPÊ Project

Network performance measurement service expansion using low cost, small form-factor hardware

RNP
Research and Development Division

Outubro 2013

Ministério da Cultura
Ministério da Saúde
Ministério da Educação
Ministério da Ciência, Tecnologia e Inovação
GOVERNO FEDERAL BRASIL PAÍS RICO É PAÍS SEM POBREZA

AGENDA

About MonIPÊ

- RNP's perfSONAR-based monitoring service
- Service architecture
- Measurement scenarios
- Types of measurements
- Network metrics
- Service infrastructure in the backbone
- Measurement kit for client institutions
- Measurements portal

Service Pilot

- Objectives
- Scenarios to be evaluated

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Measurement services

Objectives

- High precision measurements of network performance
- Reports of regular measurements
- Last mile performance measurements
- An environment for verification and monitoring of network performance
- Coverage expansion of measurement points
- Instrumenting the network of end users

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Measurement Scenarios

International (WAN)

- Regular measurements between RNP and other NRENs

Backbone (WAN)

- Regular measurements in all backbone links between the core network PoPs

Access and Last Mile (End users)

- Regular measurements between PoPs and their directly connected client institutions

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Types of Measurements

All measurements have duration as one of their main characteristics:

On-demand

- Small timeframe measurements by any user that needs to diagnose end to end performance (e.g.: videoconferencing application for a meeting)

Periodic

- Scheduled and stored for evaluation of specific events and periodic diagnostics (e.g.: demos)

Permanent

- Unlimited duration, intended to support proactive network performance management

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Metrics

Monitoring should be able to report

- One-way delay
- Bidirectional delay
- Packet loss
- Achievable bandwidth (in both TCP and UDP)

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MonIPE Infrastructure

- Core network (Ipê Network) will have a measurement portal and information services by measurement points located at PoPs

MPs at PoPs

- Measurement points (MPs) in virtual machines for delay and achievable bandwidth measurements

- MPs for measurements of achievable bandwidth up to 10Gbps will be built and deployed

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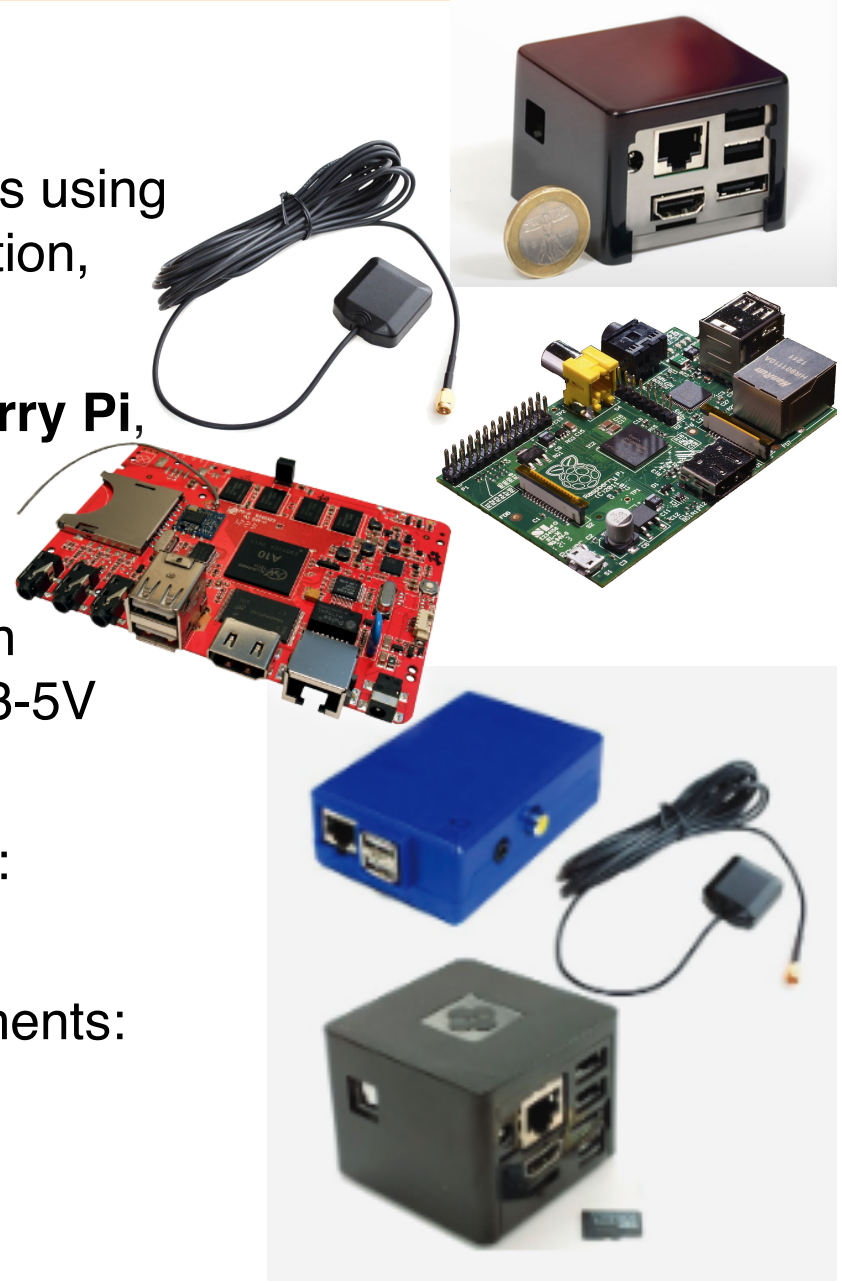
End user client institution measurement points

- Project developed kits of measurement points for high precision delay measurements using low cost and power consumption, small form-factor hardware
- Evaluated platforms: **Raspberry Pi**, **CuBox** and **Hackberry**
- GPS antenna: **Adafruit GPS** used for clock synchronization (Adafruit GPS SMA Antenna 3-5V 28dB 5m - External, Active)
- MPs for delay measurements: **Raspberry Pi**
- MPs for bandwidth measurements: **CuBox**



1. Raspberry Pi: http://www.raspberrypi.org/
2. CUBox: http://http://cubox-i.com/
3. MonIPE Components: http://goo.gl/rNEFWO

Measurement Portal

Some development premises

- Simplified deployment
- Measurement portal with seamless navigation
- Web based graphic user interface for:
  - Management
  - Kits configurations
  - Measurement tests scheduling

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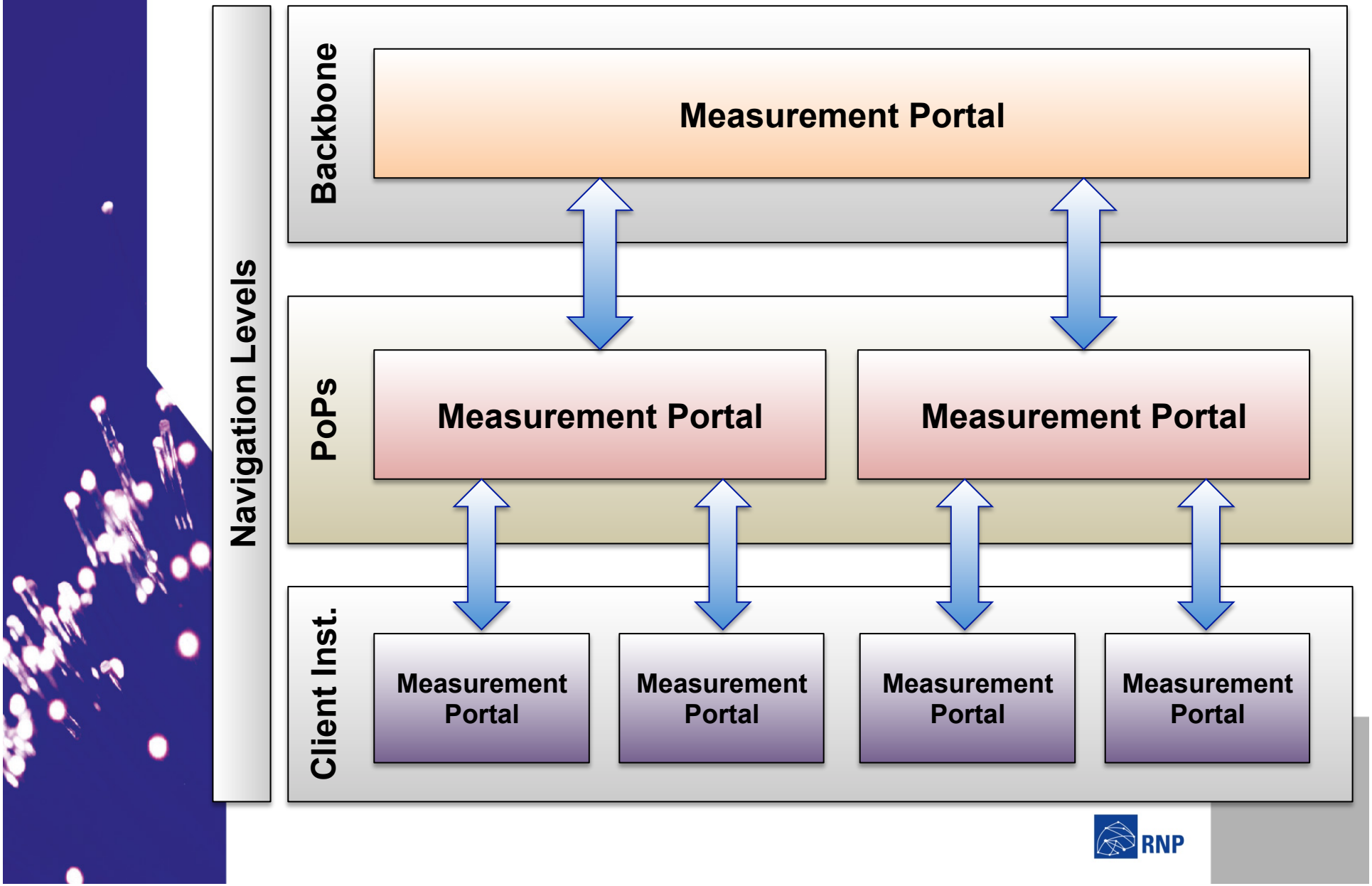
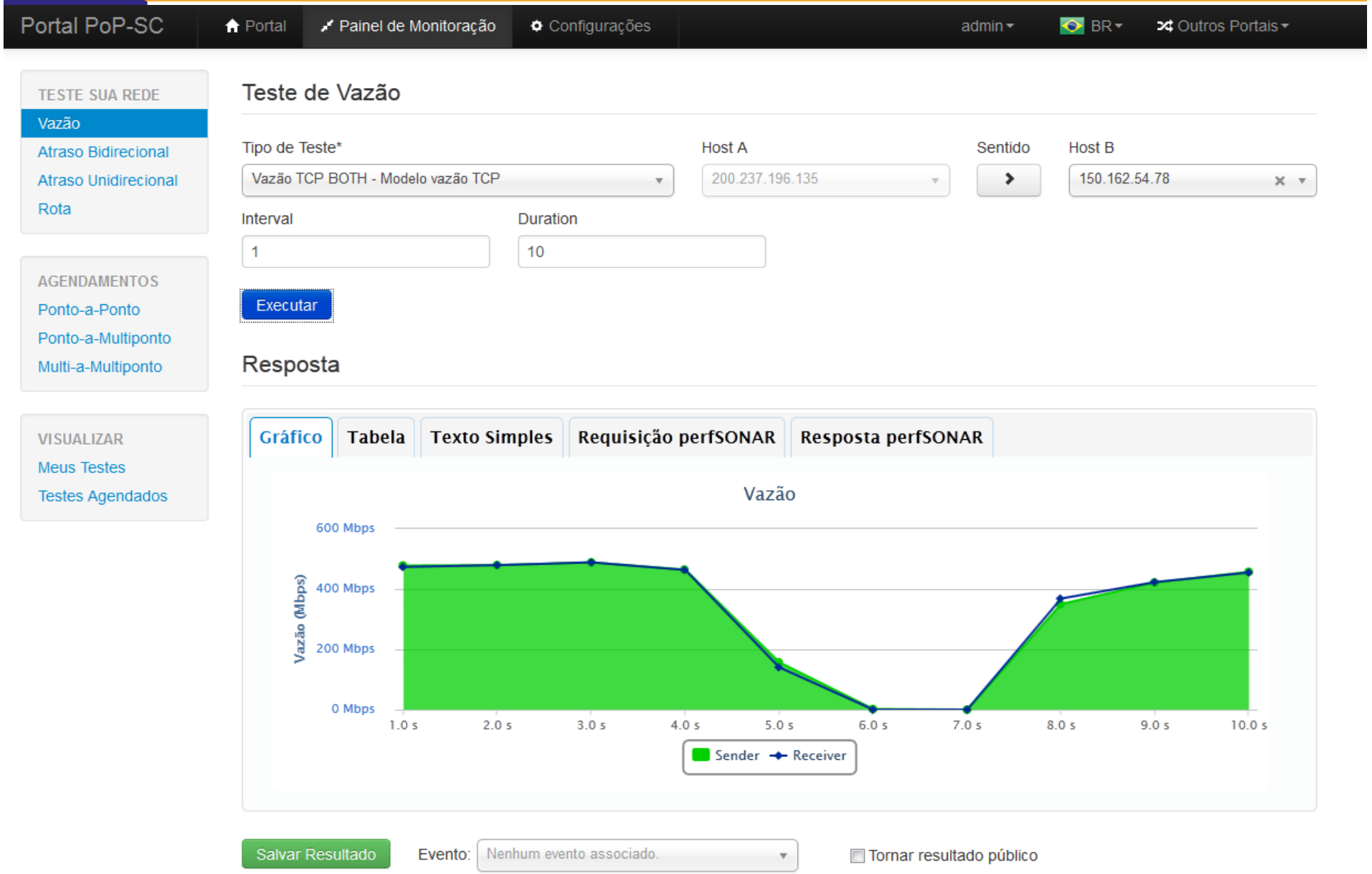
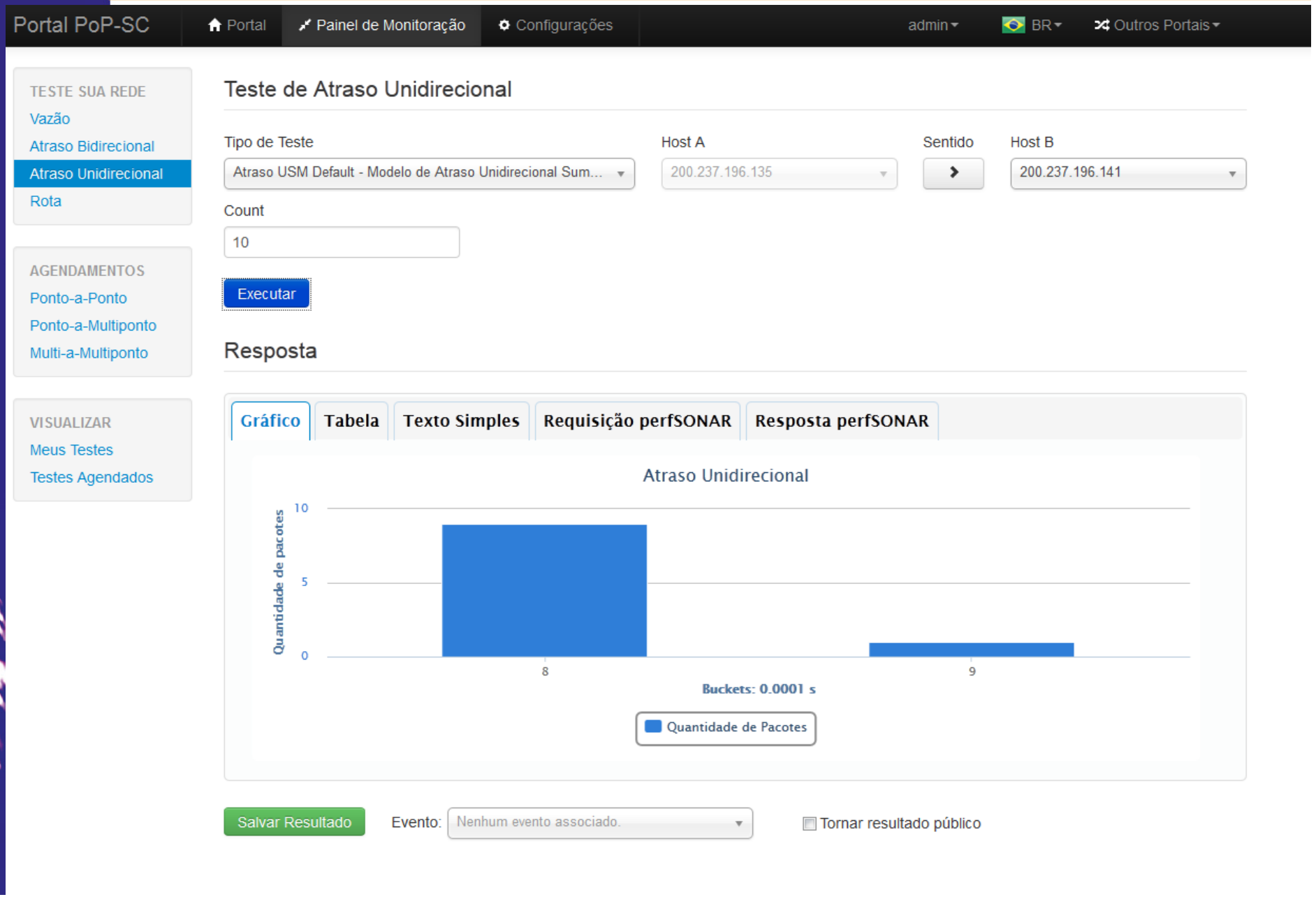
MonIPE Portal Navigation Architecture



MonIPE User Interface: Bandwidth Test



MonIPE User Interface: One-way Delay Test



MonIPE User Interface: Scheduler

Portal PoP-SC | Portal | Painel de Monitoração | Configurações | admin | BR | Outros Portais

TESTE SUA REDE
- Vazão
- Atraso Bidirecional
- Atraso Unidirecional
- Rota

AGENDAMENTOS
- Ponto-a-Ponto
- Ponto-a-Multiponto
- Multi-a-Multiponto

VISUALIZAR
- Meus Testes
- Testes Agendados

Testes agendados

Nome da Agenda: *Matriz RASP*
Tipo de Agenda: *Multi-a-Multiponto*
Tipo de Teste: *Atraso Bi.*
Data: *13-09-2013 14:51:19*

Parâmetros
count: *10*

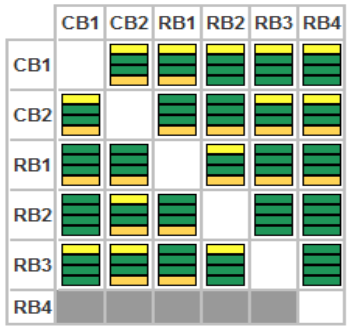
Última hora | Últimas 24 horas | Últimos 7 dias | Último mês

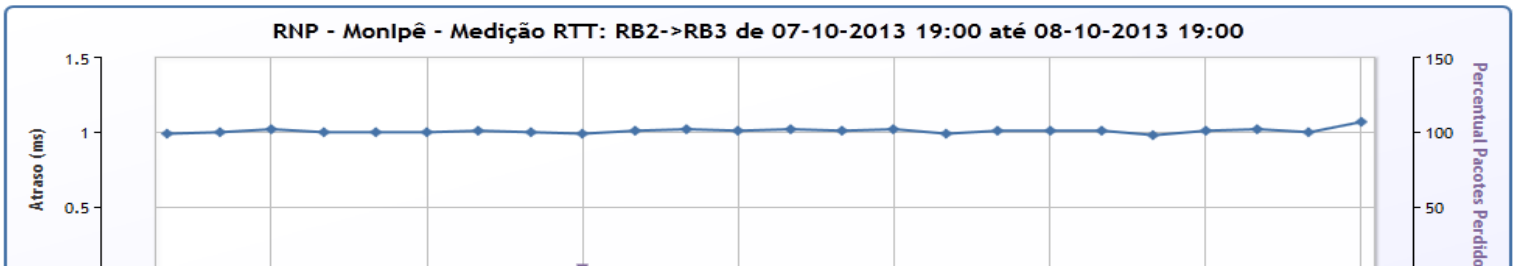
Data de Início	Hora de Início	Data de Fim	Hora de Fim
07/10/2013	19:00	08/10/2013	19:00

Mostrar Resultados | Voltar

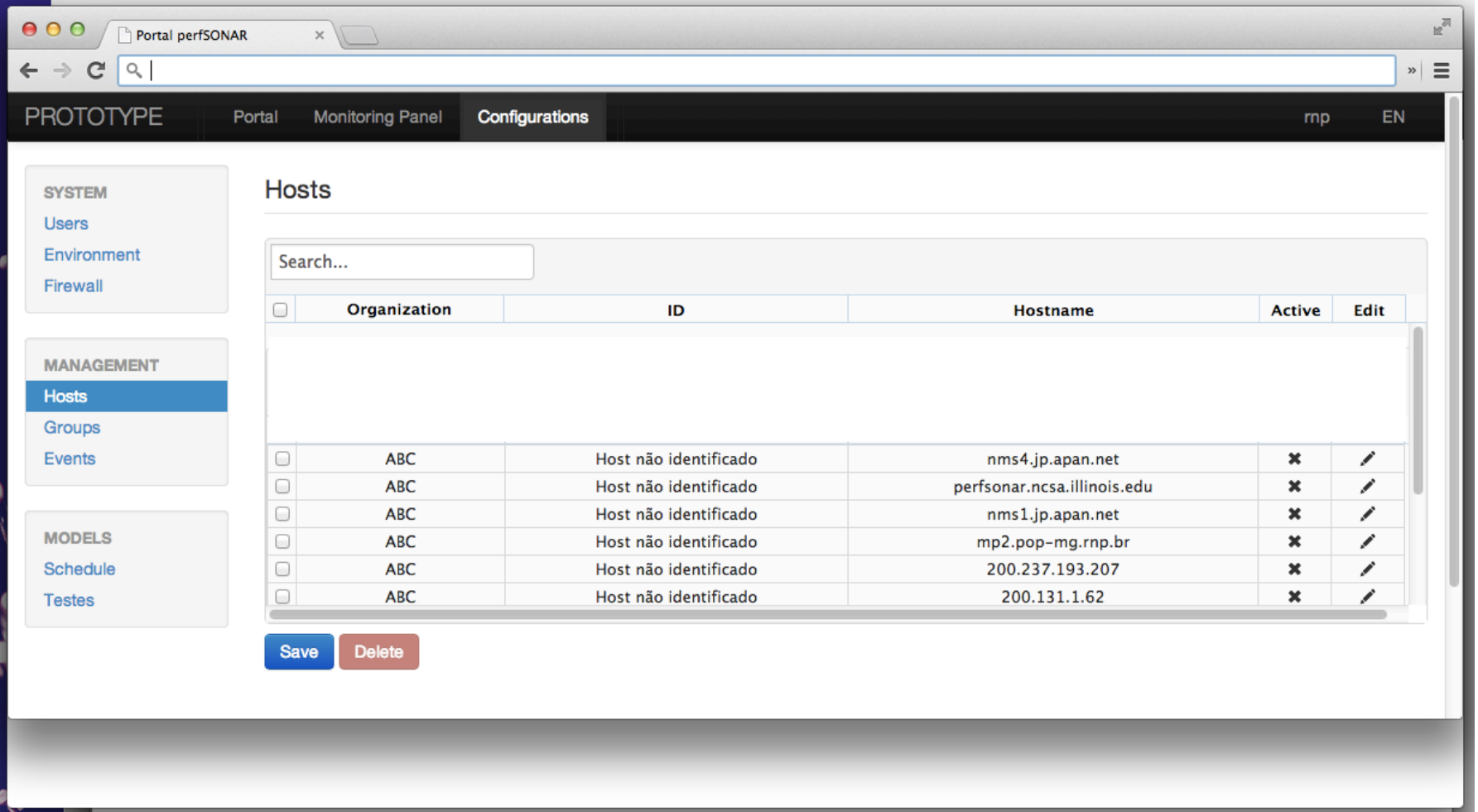
Medição Atraso Bidirecional
07-10-2013 19:00 a 08-10-2013 19:00

Pacotes Perdidos	P (Pacotes): Total / Perdidos / % Perda	% Perda:	0% a 1%	1% a 20%	20% a 50%	> 50%	Sem dados
Variação	V (Variação) : Mínima / Média / Máxima	V. Máxima:	< 4ms	4ms a 10ms	10ms a 20ms	> 20ms	
Atraso	A (Atraso) : Mínimo / Média / Máximo	(Máx - Mín):	< 10ms	10ms a 20ms	20ms a 50ms	> 50ms	
Testes Perdidos	T (Testes): Total / Perdidos / % Perda	% Perda:	0% a 1%	1% a 20%	20% a 50%	> 50%	





MonIPE Portal Administrative Interfaces



MonIPE Pilot

Objectives

1. **Service model validation:** deploy MonIPÊ infrastructure at RNP PoPs and end user institutions
2. **Service tests between domains**
   - Schedule regular bandwidth and delay tests between RNP's PoPs
   - Schedule regular bandwidth and delay tests between PoPs and user institutions
3. Perform on-demand tests between end user institutions
4. Get feedback from end users for fixes and improvements

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Pilot Evaluation Scenarios

- **PoP to PoP**
  - Test scheduling between PoPs
  - On-demand tests
- **PoP to Clients**
  - Test scheduling between PoPs and user institutions
  - On-demand tests requests
- **Client to Client**
  - On-demand tests requests

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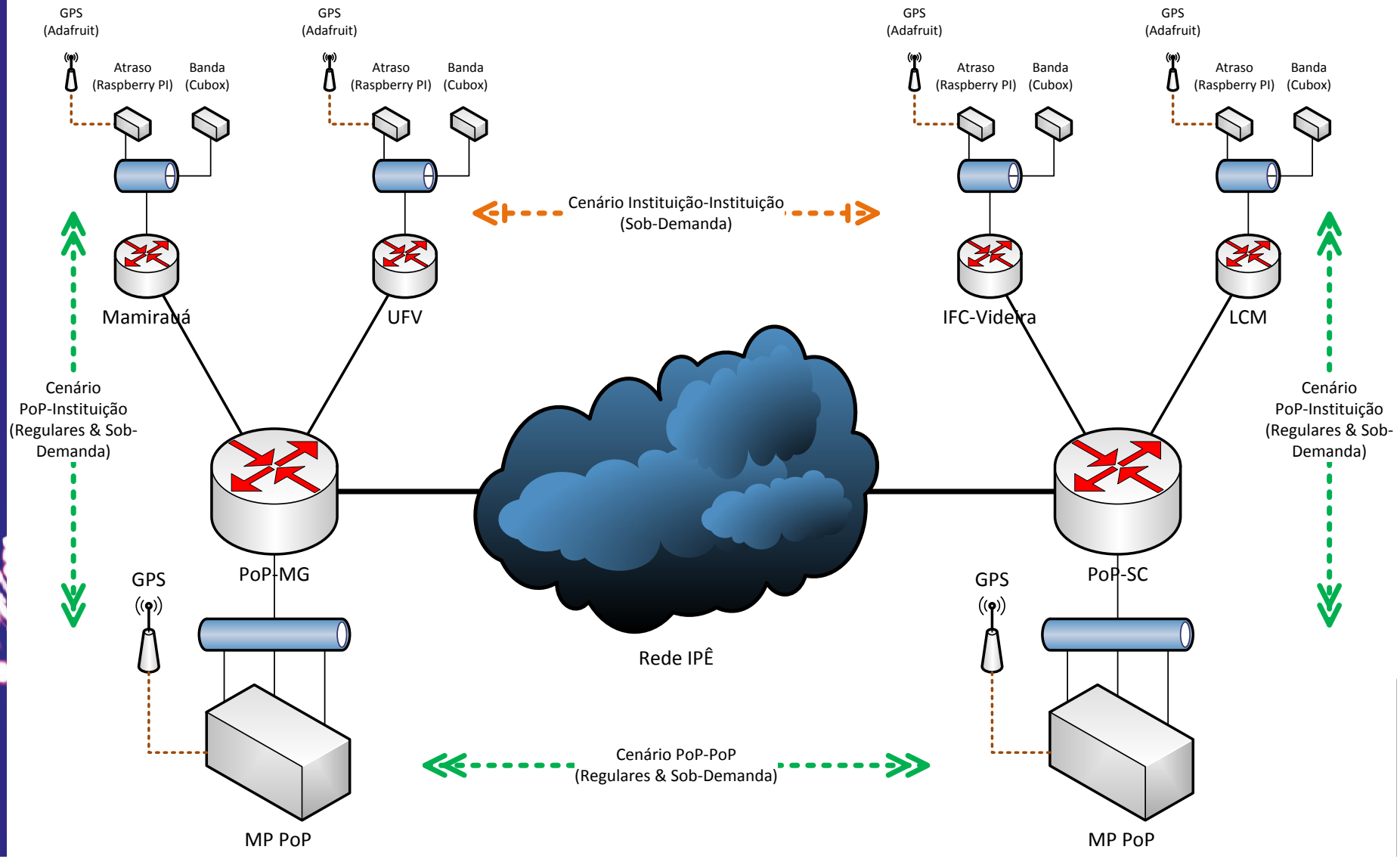
MonIPE Pilot Scenario

Data: 16/10/2013
Autor: Fausto Vetter



Project Timeline

- Start: October 14th
  - Preparations (25 days)
    - Servers deployment: Oct. 14th to Nov 1st
    - Build of kits: Oct. 28th to Nov. 8th
  - 2 PoPs: SC and MG: Oct. 28th to Nov. 8th
  - Client institutions (5 days)
    - Laboratório de Camarões Marinhos – LCM (*Sea Shrimp Lab*)
    - Instituto Federal de Videira
    - Instituto de Desenvolvimento Sustentável Mamirauá (IDSM) (satellite link)
    - RNP PoP-MG (Belo Horizonte, Minas Gerais)
- Tests (22 days): Nov. 18th to Dec. 17th

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MonIPÊ Pilot Roles

PoPs

- Deploy and configure the PoP's MP server
- Support kit deployment at client institutions
- Perform scheduled and on-demand tests according to test plan
- Evaluate and give feedback about the service

Client institutions

- Deploy the kit and GPS antenna
- Perform the basic kit configurations
- Perform on-demand tests following the test plan
- Evaluate and give feedback about the service

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Thank you!

Alex Moura
alex@rnp.br

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