



OECD WORKSHOP ON MEASURING BROADBAND TO
UNDERSTAND ITS RELATIONSHIP TO PRODUCTIVITY,
INNOVATION, ENTREPRENEURSHIP

The Future of Broadband Measurement: A Discussion of the Metrics Checklist

The Brazilian Broadband Measurement Project

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CGI.br - Brazilian Internet Steering Committee

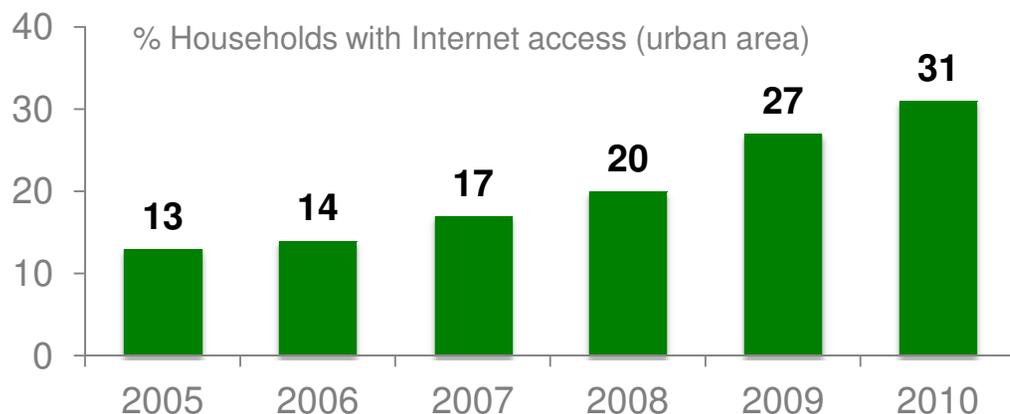
NIC.br – Brazilian Network Information Center

CETIC.br – Center of Studies on Information and Communication Technologies

Penetration rate of Internet access in Brazil

□ Population of 191 million inhabitants

□ 58.6 million households



□ 31% of Brazilian households have Internet access (urban areas):

- SES – Class A 90%
- SES – Class B 67%
- SES – Class C 26%
- SES – Class DE 4%



Sources: CGI.br: ICT Households Survey 2010
IBGE: Brazilian Census 2010

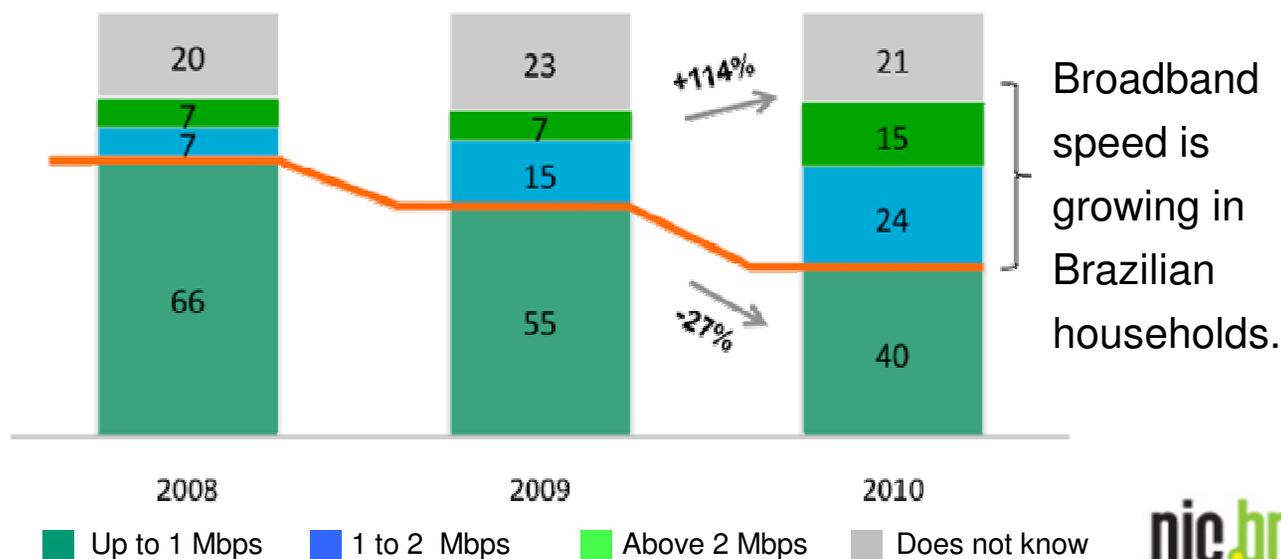
Penetration rate of Internet access in Brazil

Households with Internet access by type of access (in thousands)

Region	Households	Households with Internet	Fixed Broadband	Mobile Broadband	Dial-up access	Other
Brazil	58,646	20,526	13,958	2,053	2,668	1,847
North	4,122	948	502	152	199	95
Northeast	15,356	2,150	1,376	322	258	193
Southeast	25,745	11,585	7,762	927	1,738	1,159
South	9,067	3,808	2,970	343	343	152
Center-West	4,357	1,743	1,150	296	157	139

- ❑ 20.5 million households with Internet access;
- ❑ 13.9 million fixed broadband access.

% Households with fixed broadband access (urban area + rural area)



Source: CGI.br: ICT Households Survey 2010

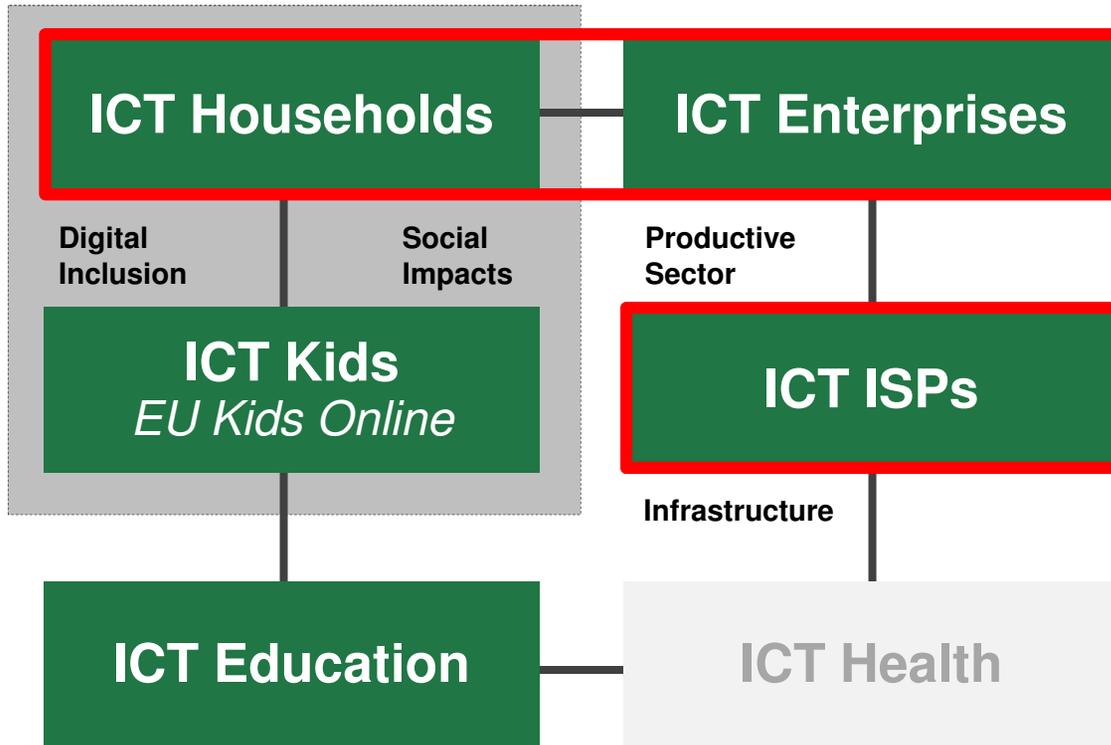
ICT Surveys in Brazil

Measurement and Statistics

Nationwide sample surveys with PAPI, CAPI, CATI and CAWI data collection methods

International standards

Main Sample Surveys



Demand side

- Type of connection & speed
- Perception of service quality
- Demand x Price (reverse auction)

Supply side

- Type of connection & speed
- Infrastructure & coverage
- Services, package prices & customers
- Customer support



ICT Surveys in Brazil

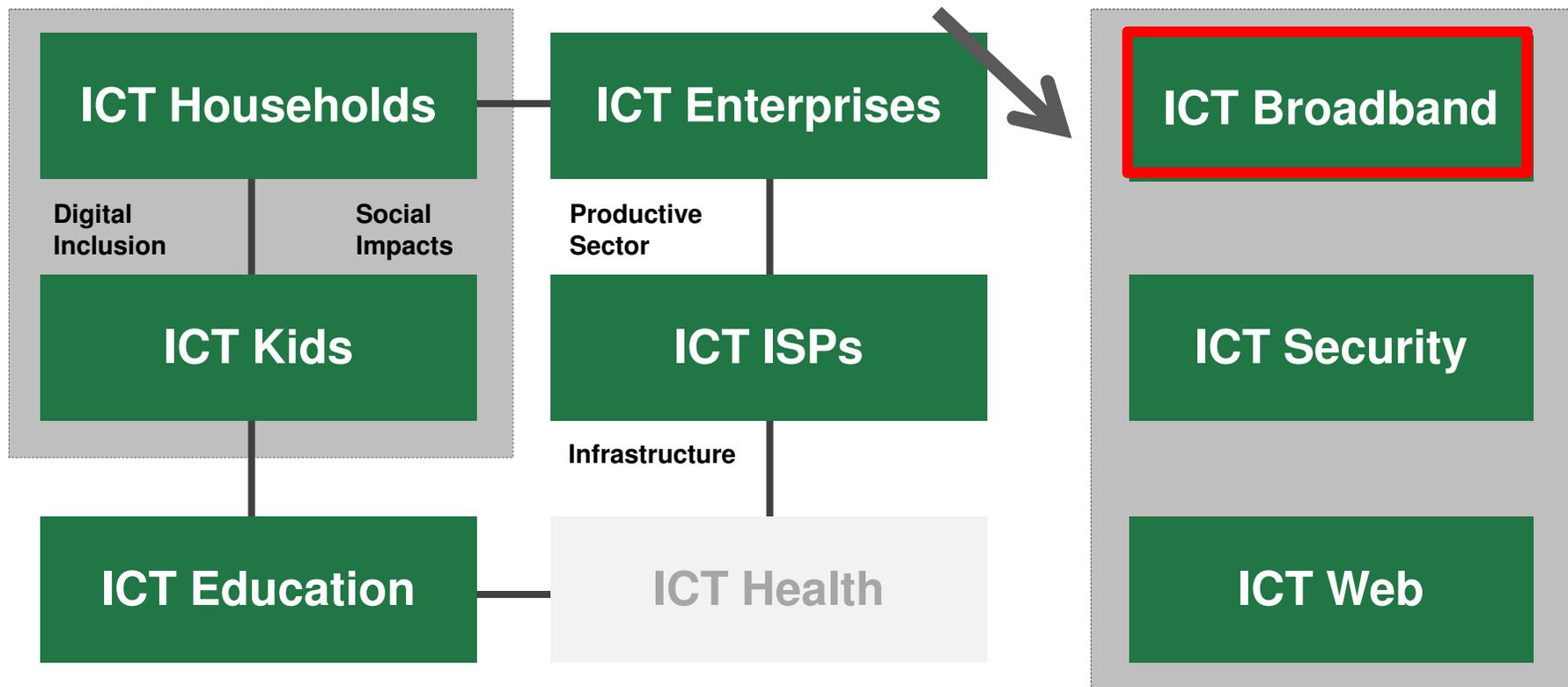
Measurement and Statistics

Internet-based Statistics

Nationwide sample surveys with automated data collection

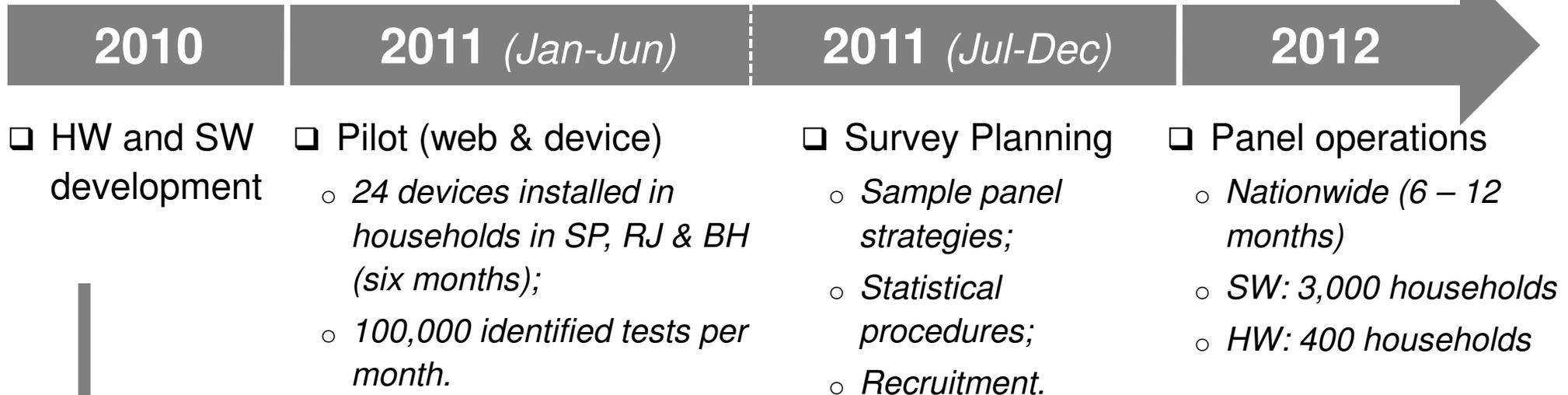
International standards

Main Sample Surveys



Broadband measurement initiatives in Brazil

Deployment of testing hardware and software



Broadband Testing Software

- ❑ Installable software version
- ❑ Web version

Broadband Testing Device

GPS Kit



Broadband measurement initiatives in Brazil

Memorandum of Understanding

- ❑ Brazilian Internet Steering Committee – CGI.br / Brazilian Network Information Center – NIC.br;
- ❑ National Institute of Metrology, Quality and Technology – INMETRO;
- ❑ National Telecommunications Agency – ANATEL.

cgi.br

Comitê Gestor da Internet
no Brasil

nic.br

Núcleo de Informação
e Coordenação do
Ponto BR

INMETRO

ANATEL

Agência Nacional de Telecomunicações

Pilot Project

- ❑ Payment of broadband access fees (1 to 10 Mbps);
- ❑ Payment of US\$ 17.00 per month (utilities);
- ❑ Installation and maintenance.

ICT Broadband Survey

Service and technical indicators: broadband characteristics

A1 Instant download bandwidth (TCP and UDP)

A2 Instant upload bandwidth (TCP and UDP)

A3 Average upload bandwidth

A4 Average download bandwidth

A5 Service availability

B1 Household GPS Location

C1 Packet Loss

C2 Packet out of order

C3 Jitter

C4 RTT (Round Trip Time)



C5 TTL (Time to Live)

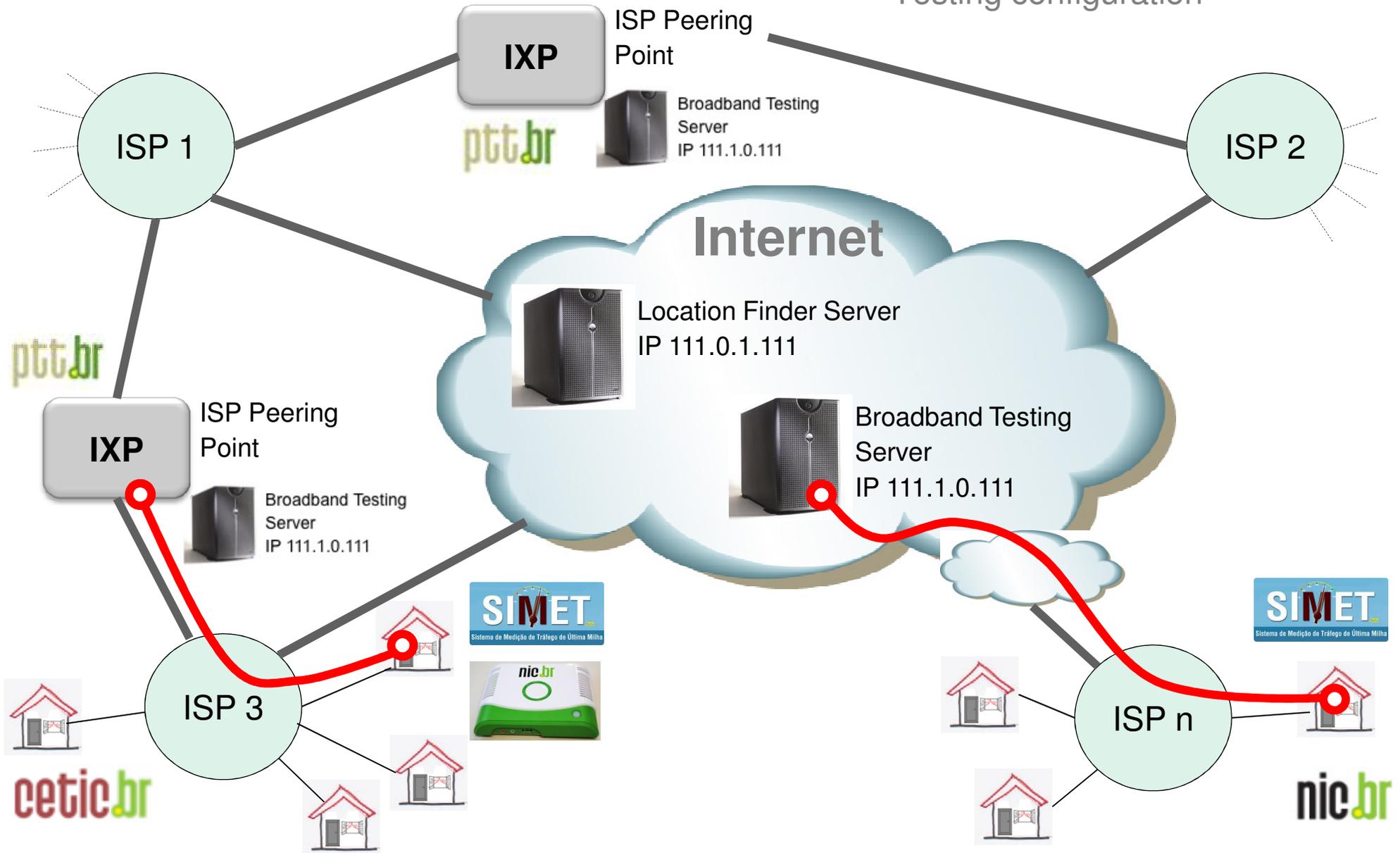
C6 Latency (one way delay)

C7 DNS Response Time

C8 Response to invalid DNS

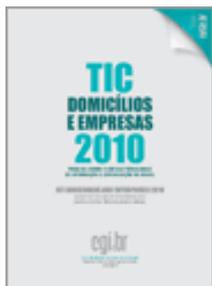
Broadband measurements

Testing configuration



Methodological Issues

Sample panel strategies

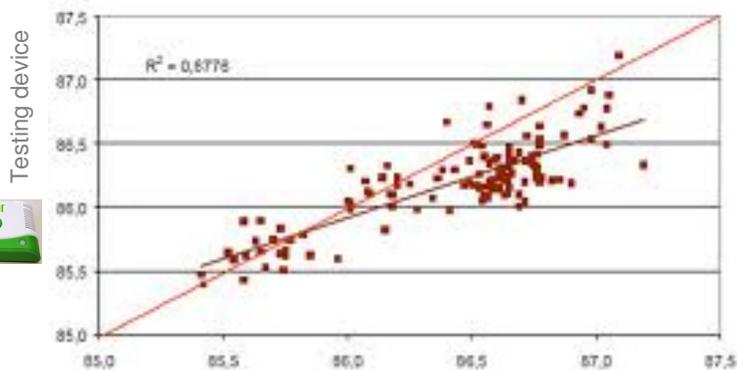


- ❑ ICT household survey / sample size n = 25,000 households:
 - *Stratified multi-stage by conglomerate random sample;*
 - *Geographic region and ISP providers.*



Multiple regression model

$$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \dots + \beta_nx_n + \varepsilon$$



Testing software



Sample Panel / n =400



Sample Panel / n =3,000



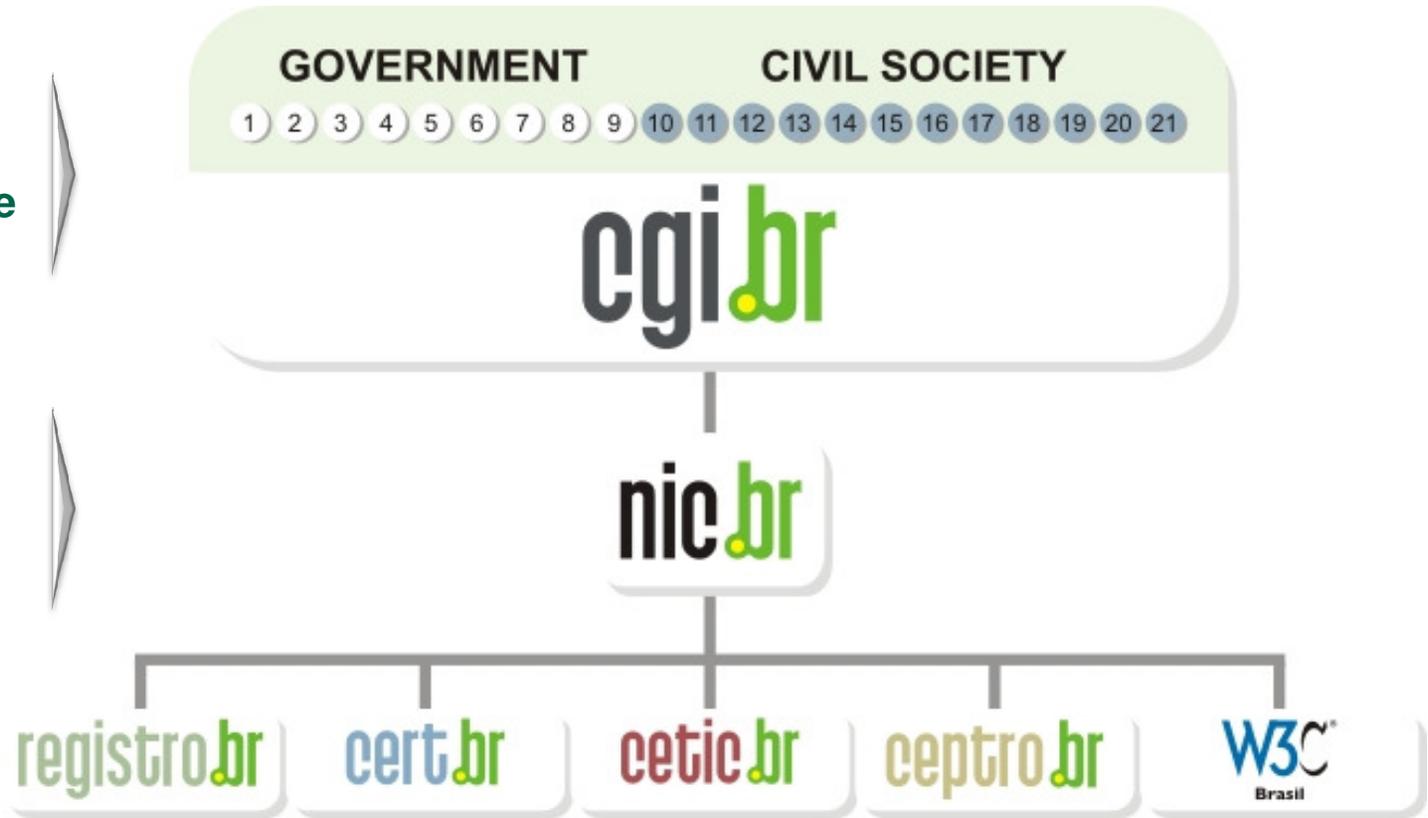
- ❑ Panel operations and maintenance:
 - *Minimum rate of activity and functioning;*
 - *Periodical replacement of household;*
 - *0800 help-desk;*
 - *Technical support: hardware maintenance;*
 - *Cost of HW device: US\$ 350 per unit;*
 - *Panel operations: US\$ 2,000,000 per year.*

About CGI.br and NIC.br

Internet Governance Structure in Brazil

Brazilian Internet Steering Committee

Brazilian Network Information Centre



Thank you!

ICT Surveys are available for download at www.cetic.br

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