www.pern.edu.pk

Pakistan Digital Divide Update:
PAKISTAN EDUCATION & RESEARCH NETWORK

By

Dr. Tanveer ul Haq
Director PERN
Higher Education Commission, PAKISTAN

24 May 2005, Daegu, Korea

National ICT in Education Strategy Experience

- ➢ **ESR (Education Sector Reform) Association**
- ➢ **Comment by Provincial Education Secretaries**

"You are talking about putting computers in schools that don't even have ceilings"

Information Technology
Initiatives, Strategies, Issues

Initiatives

- ➢ **Ministry of IT & Telecomm**
- ➢ **Planning Division**
- ➢ **Ministry of Education**
- ➢ **Higher Education Commission**

MOIT Projects

- ➢ **E-Governance Program**
- ➢ **IT Training of Government Employees**
- ➢ **IT Infrastructure in Colleges/Polytechnics**
- ➢ **IT Programs for Provincial, District and City Governments**
- ➢ **Development of Urdu Language Software Extendable to Regional Language**
- ➢ **Industrial Information Network (IIN) for the Development of SMEs in Pakistan**
- ➢ **Open Source Software Initiatives**
- ➢ **Initiatives for Promotion of Local Software Industry**

IT Services Access

- ➢ **Infrastructure and availability of Telecom Facilities**
- ➢ **Affordability**
- ➢ **Applications and Content**
- ➢ **Literacy**

Digital Divide Action Plan of MoIT

- ➢ **Universal Service Obligations on all carriers**
- ➢ **Telecom De-regulation**
- ➢ **Cellular Mobile Policy**
- ➢ **Adoption of new technologies like Wireless Local Loop**
- ➢ **Development of local content, in local languages**
- ➢ **Affordable Access to legal Software**
- ➢ **Public Access to Information**

Digital Access Growth in Pakistan   (2000 – 2004)

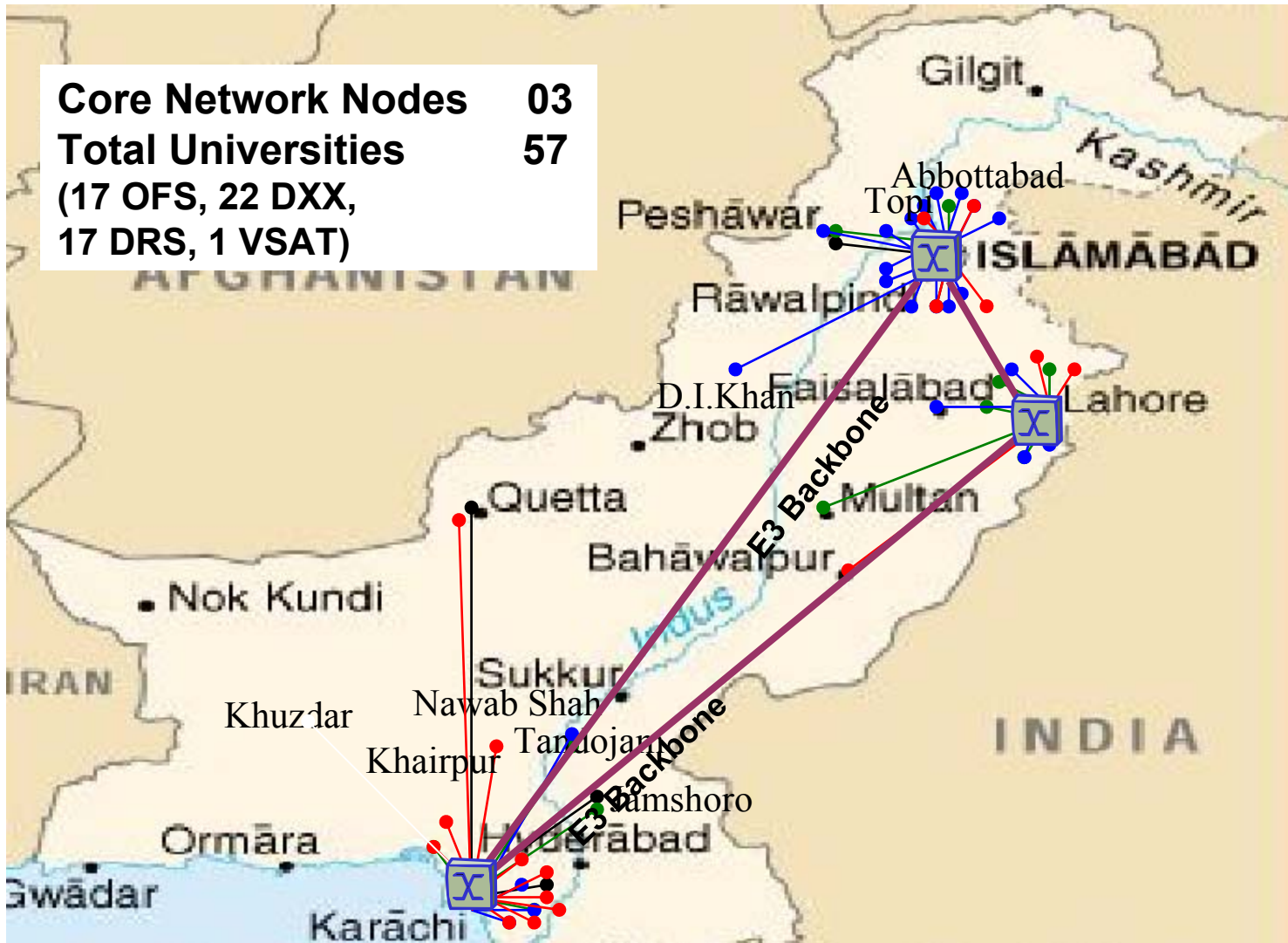|	2000	2001	2002	2003	2004 (Projected)
PTCL Fixed Network Capacity (Million lines)	3.89	4.1	4.33	4.97	5.3
Fixed line Tele-density (%)	2.45	2.50	2.75	2.90	3.25
Combined Tele-density					7.0
Digitalization (%)	90	95	98	99.8	100
Cities on fiber optic connectivity	110	140	210	380	600
Bandwidth (Mbps)	32	200	254	580	735
Bandwidth Rates (E1 Line)	$87,000	$6000	$6000	$5400	$4800
Cities on Universal Internet Access	29	530	800	1707	2000
Total Cellular Customers (in Million)	0.32	0.70	1.10	2.8	4.2 (current)
PTML Share Customers (in Million)	0.04	0.12	0.28	0.55	1.2

What is PERN?

- ➤ **Vision of Prof Dr Atta-ur-Rahman, Chairman Higher Education Commission**
- ➤ **Intranet for Collaborative Research and Learning**
- ➤ **Pakistan's Information Highway**
- ➤ **56 Universities Online**
- ➤ **Sponsors**
  - Ministry of IT & Telecom
  - PTCL: Pakistan Telecommunication Company Limited
  - NTC: National Telecommunication Corporation
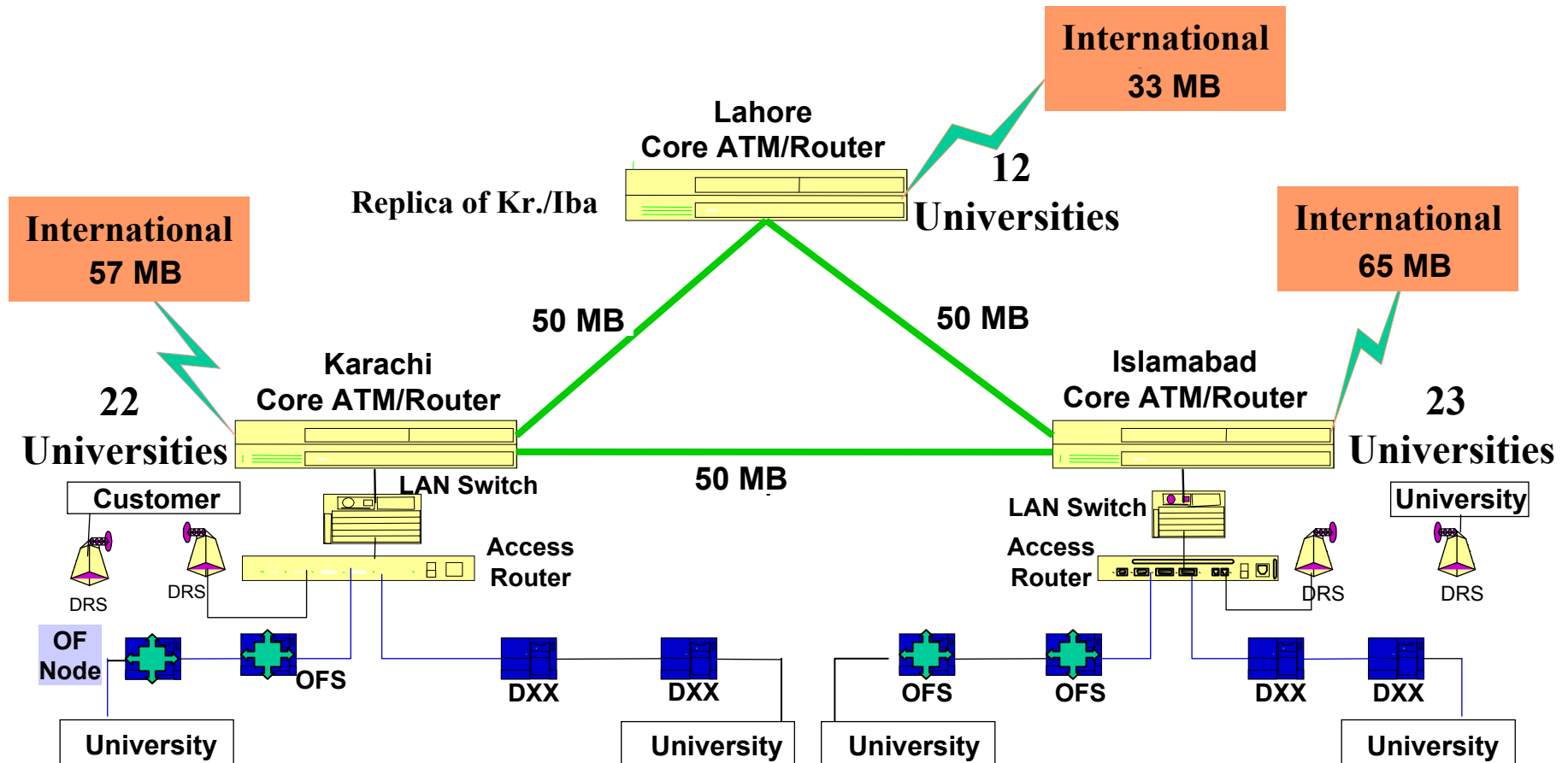 - HEC: Higher Education Commission

PERN Nodes

Core Network Nodes   03
Total Universities   57
(17 OFS, 22 DXX,
17 DRS, 1 VSAT)

Network Architecture

University Connectivity Status: Phase I

Last Mile Access Type	Planned	Operational
Optical Fibre	17	17
Digital Radio System	16	16
Digital Cross Connect	23	23
VSAT	1	1
Total	57	57

Operations and Maintenance

➢ **NTC**   **Email: pern@ntc.net.pk**

➢ **Universities**   **Contacts list on PERN Website**
                             www.pern.edu.pk

➢ **HEC**   **Email: pern@hec.gov.pk**

Landmark Decision

- ➢ **USD2500/Month for 2MB International BW to be reduced to USD2000/Month**
  - ■ 50% subsidy to Public Sector Universities
- ➢ **Still very expensive**
  - ■ 25% of existing cost
- ➢ **Thanks to:**
  - ■ President of Pakistan
  - ■ Prof. Dr. Atta-ur-Rehman
  - ■ Minister of IT Awais Ahmed Khan Leghari
  - ■ Secretary IT
  - ■ Chairman, NTC
  - ■ President, PTCL

Applications and Services

➤ **Current Services**

- International Bandwidth, IP Addresses, High BW Data Transfer
- Digital Library: >17000 Journals
- Point-to-Point Videoconferencing

➤ **Services Under Beta Trial**

- Multipoint Videoconferencing
- COI Content Generation and Sharing system
- Open Source Knowledge Repository

➤ **Planned Services**

- Video Lecturing and Web Streaming
- VoIP
- Distributed Content Servers: Knowledge Repositories
- Resource Sharing
- Automated Transactions
- Link to Research Networks: APAN

Digital Library Program

- ➤ **Programme initiated in February 2004**
- ➤ **INASP negotiated licenses and access with the publishers**
- ➤ **Cost of resources was related to the GDP of Pakistan**
  - ▪ Resulting in approx. 87% discount from list price
- ➤ **All costs have been met by HEC**
- ➤ **95% of all universities registered by June 2004**
- ➤ **Over 150 participating institutions**
- ➤ **Over 17000 Full Text Journals**
- ➤ **EBSCO had 100,000 downloads in 1st 3 months.**

Video Lecturing Facility

- **Using Technology to Overcome**
  - Faculty Shortage
  - Cost of Travel
  - Access to Remote Areas
- **Initially 5 Universities plus HEC**
- **Expanded to all Public Sector Universities: 56**

PERN Technical Issues

- ➢ **Live Applications**
  - ▪ IP Addressing Issue
- ➢ **Distributed Data Storage and Retrieval**
- ➢ **Lack of Expertise in Universities**
- ➢ **NTC is a government agency**
- ➢ **Legacy architecture**
- ➢ **Core Fiber not owned by PERN**
- ➢ **Funding issues**
- ➢ **Usage**

PERN Evolution

- **PERN Development Forum (PDF)**
  - NUST, COMSATS, FAST
  - LUMS, BUIT, MUET
- **PDF Working Groups**
- **More Universities**
- **Higher & Cheaper Bandwidth: Gigabit Optical Pipes**
- **Service Level Agreements**
- **Acceptable Usage Policy**
- **International Collaborations**
- **University Involvement in Operations**
- **Next Generation Networks Research**

PoP Model for PERN Evolution: PERN Phase 2

- ➤ **HEC will invest in Backbone**
  - ▪ Rs 240 million ($4 Million) dedicated
- ➤ **Point-of-Presence to nearest NTC exchange**
  - ▪ Increase PoPs (Core Nodes) from 3 to 9
- ➤ **Universities setup last mile**
  - ▪ Public Sector Universities to be provided funds for last mile: Rs 160 Million ($2.4 million) allocated for next year

Targeting 59 new universities

International Collaboration

- ➢ **APAN Membership**
- ➢ **Representation at International Fora**
- ➢ **CRANE: COMSTECH Research & Academic Network**

PERN Website

- ➢ **Promote PERN**
- ➢ **Share PERN News and Information**
- ➢ **Coordinate PDF**
- ➢ **Launch & Advertise Services**
- ➢ **Provide Collaborative Research and Learning Tools Like COI (Communities of Interest)**
- ➢ **Organize Technical Support**

Communities of Interest (COI)

➤ **A project of collaborative learning and information sharing**

➤ **COI for Each Subject Area**

- Board of Directors
- Members
- Publications: Original, Ideas, Shared
  - Five Star review rating
  - Journal
- Activities
- Contact List
- Visitors

➤ **Vision: full fledged technical societies**

➤ **Applications invited**

Other IT Programs of HEC: Leveraging Information Technology

➢ **University Computerization & Networking**

- ▪ Computer Laboratories
- ▪ Campus wide high-speed LAN: Rs 40 million ($700 K) for each university

➢ **PAKSAT – 1**

- ▪ Free use of bandwidth for educational purposes

➢ **Distance Education**

- ▪ Virtual University
- ▪ Educational TV Channels

➢ **e-HEC**

➢ **Open Access to Journals**

Other Activities Across Pakistan

➢ **NUST Institute of IT: VRVS Reflector**
- Collaboration with CERN and SLAC on GRID Technology
- Research on GRID Architecture
- Software development for GRID Applications
- CMS Production Centre

➢ **National Center for Physics, Quaid-e-Azam University**
- Certified and tested LCG GRID Node
- NCP became Regional Center for CMS Production in August 2003.

➢ **Currently there are five CMS Production Centres in Pakistan**
- NUST (Rawalpindi)
- NCP (Islamabad)
- PAEC-I (Islamabad)
- PAEC-II (Karachi)
- PAEC-III (Taxila)

Challenges

- ➢ **Lack of Expertise**
- ➢ **Awareness**
- ➢ **Lack of exposure**
- ➢ **Funding**
- ➢ **How to get connectivity to other networks?**

Idea for Use of Paksat-1

➢ **Transceiver in collaborating institution**
  - CERN
  - GEANT
  - APAN
  - Korea
  - GLORIAD

➢ **Transceivers in 5 Pakistani Universities**
  - Universities could become GRID Nodes: NUST, Quaid-e-Azam University; National Center for Physics, HEJ Research Institute, LUMS etc.

Conclusion

- ➢ **PERN is a stimulant for advancement of Higher Education in Pakistan**
- ➢ **Applications and Services**
- ➢ **Website Launched**
- ➢ **Network Evolution**
- ➢ **International Collaboration**