
Terms of Reference (ToR) Technical Adviser

The National Communications Authority of Timor-Leste, formally Autoridade Nacional de Comunicações (ANC), is a statutory authority established by the Telecommunications Decree-law No. 15/2012 of 28 March 2012 and update by Decree-law No. 31/2024 of 06 September 2024.

The ANC is establishing a national Internet Exchange Point (IXP) to improve local traffic exchange, reduce latency, and foster a more resilient Internet ecosystem. The IXP, hosted by ANC, will serve as a neutral and secure facility for interconnecting ISPs and key network operators.

This project requires a Technical Adviser to guide the technical implementation, design virtualized infrastructure for auxiliary services, act as a liaison with Asia Pacific Network Information Centre (APNIC), and ensure capacity building and knowledge transfer to ANC staff.

A. Objectives of the Assignment

To provide expert support for recommendations and assessments for IXP hardware and physical network design, develop and implement technical guidelines, liaise with APNIC to request and manage ASN, IP address allocations, RPKI resources, support the installation and configuration of IXP infrastructure components, including the route server, IXP Manager, DNS root mirrors, looking glass, and monitoring systems, and deliver capacity building and technical training for ANC staff.

B. Scope of Work

1. Inception Report

This inception report outlines the initial findings and recommendations for the hardware, virtualization needs, and infrastructure setup required to deploy and operate the Timor-Leste Internet Exchange Point (IXP).

2. TL-IXP Operational Guidelines

This Guidelines to define rules, procedures, and expectations for all members—ISPs, content networks, governments, universities, and other stakeholders. This prevents misunderstandings and ensures consistent behavior at the exchange.

3. IXP Core Infrastructure Setup

- Design and configure route servers using BIRD.
- Deploy and configure IXP Manager Platform.
- Establish BGP peering sessions between member networks and the route server.
- Implement routing security practices: RPKI validation, IRR filtering, BGP community tagging.
- Assign and configure VLANs on core switches for interconnection between IXP members and services.

4. Virtualized Infrastructure Design and Deployment

- Design virtual server infrastructure using Proxmox, KVM, or VMware
- Deploy services on VMs:
 - Looking Glass (e.g., BGPView, LG)
 - DNS Root mirror (e.g., AS112, F-Root)
 - RPKI validator, NTP server, IRR mirror
- Ensure redundancy, isolation, and security for all services

5. Monitoring, Logging, and Security

- Install and configure monitoring tools (Zabbix, Grafana, etc.)
- Set up system and BGP log monitoring with alerting
- Harden systems and implement user access controls and firewalls

6. Technical Documentation and Policies

- Develop operational manuals and configuration templates for:
 - Route servers
 - IXP Manager
 - Member router onboarding

- Route IX services
- VLAN configurations on core switches
- Draft the following policy documents:
 - Peering Policy
 - Acceptable Use Policy (AUP)
 - Route Server Policy
 - DNS Hosting Policy

7. Capacity Building and Knowledge Transfer

- Conduct structured workshops and hands-on training for ANC staff
- Deliver guides, manuals, and troubleshooting checklists
- Develop a sustainability and handover roadmap

8. Post-Deployment Support & Troubleshooting

- Provide remote/on-site support for a period of 60–90 days after deployment
- Assist with troubleshooting, member onboarding, and service upgrades
- Remain available for guidance during infrastructure changes and equipment upgrades

9. Liaison and Community Coordination

- Coordinate with APNIC on ASN/IP allocation, RPKI, and member registration
- Engage DNS root operators (e.g., ICANN, PCH) for mirror deployment

C. Qualifications and Experience

- Bachelor's degree in Computer Science, Networking, or related field
- Minimum 5 years' experience in Internet infrastructure and BGP operations
- Strong knowledge of:
 - Route server software (BIRD, FRR)
 - Linux systems, virtualization (Proxmox, KVM, VMware)
 - VLAN configuration and switch management (Cisco, ZTE, etc.)
 - DNS (Bind, Knot), RPKI, IRR
 - IXP Manager, Looking Glass tools

- Experience with APNIC processes (ASN, IP allocation, RPKI)
- Demonstrated capacity-building and training skills
- Prior experience in community-based IXP projects is a plus
- Good verbal and written language skills: Tetum, English and Portuguese (desirable)
- Be a citizen of Timor-Leste.

D. Reporting and Coordination

The Technical Adviser will report to the Chairman of ANC and coordinate closely with ISP technical contacts and APNIC. Deliverables must be submitted in English, optionally in Tetum or Portuguese.

E. Duration and Payment Terms

- Duration: 3 months (part-time depending on contract)
- Payment will be made in tranches upon successful delivery of milestones
- Support availability during a 60–90 day post-deployment period is expected

F. Submitting Applications

- Cover letter; An up-to-date resume (curriculum vitae) and any relevant documents.
- The application should be submitted by either hard copy or soft copy as follows:
- For hard copy application, please direct to:

Autoridade Nacional de Comunicações (ANC)
Avenida Xavier do Amaral Caicoli, Dili, Timor-Leste

For soft copy application, please email to: carmelita.tolentino@anc.tl