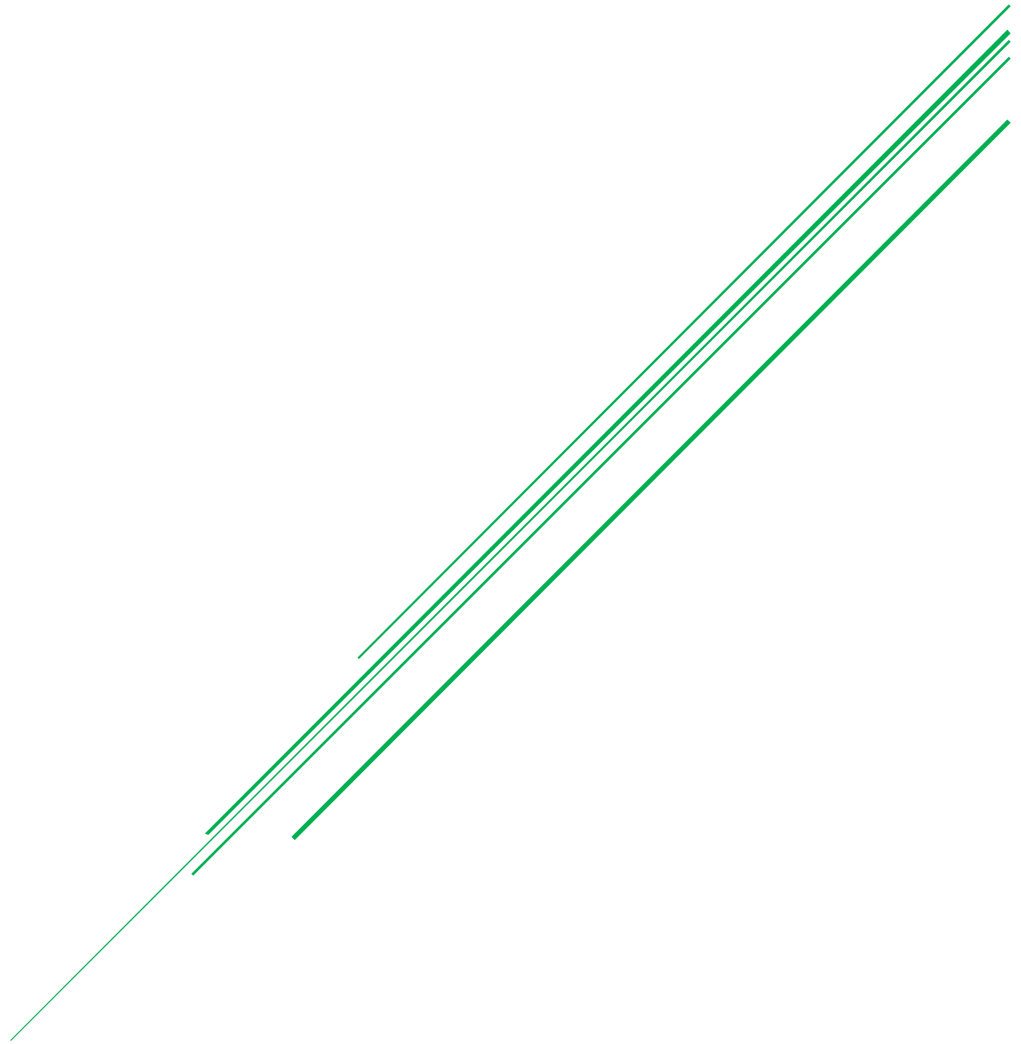# OPERATIONALISATION OF THE PACIFIC ISLANDS INTERNET EXCHANGE INCORPORATED

David Mill
3 December 2024

Declaration and Disclaimer

This Report has been prepared by the consultant, Mr. David Mill, for the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), in support of the Pacific Internet Exchange Points in the framework of the Asia-Pacific Information Superhighway Action Plan 2022-2026. This Report is intended as a practical guide should other Asia-Pacific developing countries contemplate any similar organisational structure.

In preparing this Report, the author has relied primarily on information from the members of the Committee of the Pacific Islands Exchange Incorporated, information from publicly available sources, the author's actual experience in relation to administering of an Internet exchange as an incorporated society in New Zealand. While reasonable measures have been taken to confirm, verify and validate external sources, the author provides no warranty, express or implied, regarding any information referenced within.

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Overview

The United Nations has commissioned this Report to draft an action plan to guide the Committee) assisted by the ESCAP secretariat, on what the Pacific IXP Committee needs to complete in the first 24 months of operation, including responsible actors and timeframe. This action plan was shared with the Pacific IXP Committee for their review and inputs.

Goals:

1. To launch a multi-country IXP (Internet Exchange Points) with nodes in Fiji, New Zealand and Samoa.
2. To encourage members from other South Pacific Island Countries to join the IXP.

Upcoming steps for the next 24 months

1. **Organisation establishment and set-up**

The organisation will have the basic accounting, legal, email, and document services established, including having a bank account and IRD number. The organisation should also have a basic web presence, and a simple document stating its intent.

2. **Technical build sign-off and multi-national organisation**

The technical build should be planned, a vendor should be selected, and all datacentres and other locations relevant to the project should be chosen. Any permits, licences, and bank accounts required in Samoa or Fiji should be established by this point.

3. **IXP Launch**

To launch the IXP, all international links are established and provisioned alongside any shorter domestic circuits required. The IXP fabric will be built in each country's chosen datacentre(s), and other supporting infrastructure (such as route servers and monitoring) will be installed and provisioned. At this stage IXP will be ready to bring on its first peers and will be fully operational.

Organisation set-up

Stage One:

Description: Initially, the organisation will need some basic administrative services to function. These will include accounting systems, email systems, document storage/management, and video conferencing facilities.

Responsible party: David Mill - Consultant

Stage Two:

Description: In order to launch the planned IXP the organisation will need to be able to operate, and send and receive money in at least New Zealand, Samoa, and Fiji. It will also need relevant contracts and policies for the organisation to function.

Responsible party: Secretary - with suggested outsourcing to Internet Association of Australia if required.

The contracts and policies required at this stage are detailed in the [Legal and Policy](#) section below.

In addition to those documents, the organisation will require bank accounts, and to register as a foreign entity in at least Fiji and Samoa. We Mana, the Pacific IXP's accountants, will be able to advise more on legislation requirements in both Fiji and Samoa. Eli, the owner/manager of We Mana, has experience running business in both Fiji and Samoa.

Financial

Responsible Party: Treasurer - currently, Jocelyn Bateman. If required, establish a financial sub-committee.

It is not expected that the organisation will have any income from its members in at least the initial two years of its existence. Therefore, all funds required for the set-up of the Pacific IXP will need to be obtained from grants or similar sources.

Key organisations that have or may be able to provide grants are:

Organisation	Description
New Zealand Internet Exchange Incorporated	NZIX is a New Zealand, non-profit, member run IXP which Pacific IXP is aiming to replicate a similar model or operation. NZIX has provided the Pacific IXP with a NZ$10,000 grant to help with the initial set-up of the organisation.
Internet Association of Australia	IAA is an Australian, non-profit, member run IXP. They have an interest in supporting similar organisations in their region. IAA has agreed to provide the Pacific IXP with a AU$10,000 grant to help with the initial set-up of the organisation.
Pacific Telecommunications Council - PTC	PTC is an organisation mainly known for hosting an annual telecommunications conference in Hawaii. However, the PTC also offers grants to organisations in the region. Jocelyn Bateman, the Pacific IXP Treasurer, has applied for a grant of US$200,000 to assist with the build of the IXP. https://www.ptc.org/
APNIC Foundation and ISIF Asia	The APNIC Foundation and ISIF Asia provide grants to organisations similar to Pacific IXP and could be a source of grants. https://apnic.foundation/isif-asia/about/
ISOC	The author of the report has spoken to ISOC (Noelle Francesca de Guzman) regarding how ISOC may be able to support this project. ISOC has verbally stated they can support this organisation with their resources over at least a year. ISOC can also help with community outreach in the Pacific.

In addition to the above organisation, the Pacific Island members of the Pacific IXP may be able to request funding from organisations such as the Asian Development Bank, the World Bank, and the Pacific Regional Infrastructure Facility.

Set-up budget

As of December 2024, the Pacific IXP organisation will be operationally set-up. This will involve establishing key systems for the initial running of the organisations.

An initial budget (as of 3 December 2024) is as follows:

Income		
	Type	**Amount (all amounts quoted in New Zealand Dollars)**
New Zealand Internet Exchange	Grant	$10,000
Internet Associate of Australia	Grant	$10,000
	Total income	**$20,000**

Expenses				
	Sub-item	**Units**	**Monthly sub-total**	**Total**
Google Drive/Email	$10.80	6	$64.80	$388.80
Domain Name				$45.00
Xero – Ignite plan			$35	$210
Accountants – annual accounts				$1550
Accountants - onboarding				$800
Administrative/secretariat support			$220	$1320
	Total expenses			**$4,313.80**
	Remaining funds			**$15,686.20**

Build and fully operationalize budget

The following items will need to be budgeted for to enable the Pacific IXP to be built. It is suggested that enough funds are raised to cover the initial two years of monthly recurring costs.

Item	Description
Technical Design	An organisation or individual will need to do a network design for the Pacific IXP build. This should also produce a Bill of Materials as a required output
Network Switches and other equipment	Network switches and other equipment such as route servers will need to be purchased.
International Circuits	It is suggested that initially the organisation just establishes links between Auckland and Fiji; and Fiji and Samoa. This will likely involve both a set-up/install fee, and then recurring monthly charges.
Domestic Circuits	In some, or all cities that the IX has a presence in, a domestic fibre circuit will need to be purchased that can link from the submarine cable landing station to the data centre chosen in that city. See datacentre selection below.
Physical and Technical Build	There will be labour, and consulting costs associated with both physically installing and configuring the IX equipment.
Colocation and Power	At least in the chosen point-of-presence (POP) in each country, the Pacific IXP will need to have colocation for its switches and equipment. It might also need colocation in a landing station depending on its needs.

Long term budgets

In the long term, the yearly running costs will need to be funded by member income, with any shortfall being made from grants or similar. It is worth noting that currently in Fiji and Samoa there are only approximately 14 viable peers. This, even when combined with some additional peering sessions from New Zealand and other peerings from content providers or similar, will likely only provide income from 25 or so members.

If the yearly costs of the Pacific IXP divided by approximately 25 are more than members of the organisation are willing to pay, then any shortfall will need to be obtained from regular grants or similar. Otherwise, the Pacific IXP is not feasible in the long-term.

During the set-up phase of IXP, a long-term budget should be planned, and any funding gaps will need to be filled.

Legal and Policy

Responsible party: Secretary, or if outsourcing is required, the Internet Association of Australia is suggested.

For IXP to launch and operate it will require at least the following contracts and policies:

- Master Services Agreement
- Acceptable Use Policy
- Privacy Policy
- Services Schedule or similar
- Disconnect policy

Examples of these policies are all available on the NZIX website - https://ix.nz.

Administration and Logistics

Responsible party: Secretary, or if outsourcing is required, the Internet Association of Australia is suggested.

Initially the organisation will require the following services: Email, Mailing List, Website and basic accounting.

By the launch time of the IXP, the organisation will require: an ordering portal or similar; accounts payable and receivable processes; technical fault systems and processes.

Strategy

As stated in the Long term budgets in the financial section of this report there are issues with the long-term financial viability of the IX if we don't have enough members or other long term funding. As a method to address both of these issues, it is suggested that the Pacific IXP does a reasonable amount of outreach to both Pacific organisations and other organisations that might be able to help with funding gaps.

Outreach

It is suggested that the Pacific IXP sends a committee member, contractor, consultant, or similar, to key Pacific events during the establishment and early stages of the IXP. These events would likely include:

- PacNOG
- PITA
- APRICOT

The Pacific IXP could ask the Internet Society (ISOC) regarding funding for this, or other suggestions for outreach. The purpose of attendance of these events would be to both get interest from potential members, but also to find or establish short- or long-term funding for the organisation.

Technical Plan

1. Technical Sub-Committee

As there is not an organisation role such as CTO within the Pacific IXP currently it is suggested that the organisation forms a technical sub-committee to govern the technical design and build, and make decisions as required.

In addition to the technical sub-committee, the sub-committee may wish to contract a consultant to the organisation to oversee the design and build if it is deemed necessary. If so, organisations such as the Internet Association of Australia, or SearchLight Ltd, could be suitable for such a role.

2. Samoa IX

It is recognised that either metropolitan or national IXPs should come before multi-national IXPs. This will ensure that traffic stays local, and that peering costs are kept minimal for national transit as there are no submarine costs. Therefore, it is recommended that the Pacific IXP ideally waits for Samoa IXP to be launched before launching their own multi-country IXP fabric. This will ensure all local traffic remains local in Samoa, and only crosses expensive submarine connections when absolutely required.

3. Architecture, Design and Plan

Responsible party: Technical sub-committee

Pacific IXP will need an organisation to initially create a high-level architecture for the mutli-country IXP. This will likely use technology such as MPLS/VPLS or EVPN/VXLAN; Spanning Tree is not advisable. The architecture document should encompass common IXP layer 2 mitigation techniques such as those deployed already on NZIX exchanges and detailed at https://ix.nz/service/peering/technical/ .

Once architecture has been chosen, a high-level design document can be created, alongside a sample bill of materials (BOM). This will enable consultation with potential vendors (see vendor section below) through a RFP process or similar. Once that process is completed, a vendor can be locked in, and a detailed design produced and an order for equipment placed with the chosen vendor or distributor.

Finally, a building plan should be produced, as a multi-country IXP build will be complex, and should be planned in a reasonable level of detail.

It is likely that the Pacific IXP will need to outsource the work described in this section and if required then it is suggested that SearchLight Ltd or the Internet Association of Australia would be suitable for this work. It is noted that the author of this report is an employee of SearchLight Ltd and is associated with the Internet Association of Australia.

Technical Build

1. Datacentre Selection

From conversations within New Zealand, and with the Pacific IXP contacts in Fiji and Samoa it is suggested that the following data centres are initially targeted:

- Fiji: Vatuwaqa Communication Center, 151 Rifle Range, Suva. https://fintel.com.fj/
- Samoa: National University of Samoa, To'omatagi, Vaivase Rd, Apia, Samoa
- New Zealand: Data Centre 220, 220 Queen St, Auckland https://www.datacentre.co.nz/

2. Vendor Selection

It is suggested that the Pacific IXP consults with a selection of the following vendors on their layer 2 fabric requirements.

Vendor	Description
Cisco	Cisco is often regarded as the safe, original vendor. They have a strong presence in New Zealand, and would be worthy of consulting with over the building of a layer 2, IXP fabric.
Juniper	Juniper has a strong following in New Zealand and the Pacific in the Service Provider space. They have local systems engineers that would be happy to engage with the Pacific IXP.
Extreme	NZIX used Extreme and has done so for its entire lifespan. Extreme has a robust VPLS solution suitable for IXPs, however, their most recent products seem technologically behind, and they are being surpassed by more nimble organisations such as Arista and Cisco.
Arista	Arista is the new player in the market, but has a trusted, robust product, with proven experience in the IXP market. Arista has a strong presence in New Zealand and local technical experts that would be willing to engage with the Pacific IXP.

3. Fibre Route/Provider Selection

It is suggested that initially the IXP uses submarine cables to connect Samoa to Fiji, and Fiji to New Zealand. There is currently no direct connection between Samoa and New Zealand - there is a non-direct option via American Samoa. It is suggested that initially the IXP aims to purchase 10Gbps of capacity on each cable.

Fibre name	Description
Southern Cross NEXT	This is the only direct cable between New Zealand and Fiji. More details are available from https://www.submarinenetworks.com/en/syste ms/trans-pacific/southern-cross-next and https://www.submarinecablemap.com/submari ne-cable/southern-cross-next
Tui-Samoa	There is one direct cable between Fiji and Samoa, the Tui-Samoa cable. The author of this report has already made contact with the operators of the cable but hasn't received a response at this stage. https://www.ssccsamoa.com/ and https://www.submarinecablemap.com/submari ne-cable/tui-samoa

4. Build

To be successful, a build needs to establish at least the following:

- A single Layer 2 fabric that spans 3 countries/POPs.
- Suitable protections to prevent common IXP layer 2 issues.
- Access ports available at speeds that are suitable for the services offered and members (most likely 10G and 1G initially).
- 10Gbps links from Suva to Auckland, and from Suva to Apia linking the layer 2 fabric POPs.
- 3 POPs (points of presence), most likely at the University of Samoa; The Fintel datacentre in Suva, and Datacenter 220 in Auckland.
- 2 or more route servers in 2 or more countries.