24 October 2024

Now that we have the Cables:

Capacity Building and Adapting to Change –

Practical Multi-Stakeholder Collaboration in the Pacific for a Better Internet

Thursday 24 October 2024
Data X Blue Pacific
Session 5. Stock take of Regional Initiatives in Digital Transformation

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Pacific ccTLD Challenges

Developing a local digital economy

- Cables are not enough to develop a local digital economy on Pacific Islands

- Need to support local businesses to establish an online presence

- Build a local Internet community

  - Affordable telecommunications connectivity to local businesses

  - Internet Service Providers

  - Internet enabled business centres with local support

  - User forums – build community of users that exchange ideas

  - Multi-stakeholder participation in setting local regulations

Options for establishing an online presence

- Many options for local businesses to establish an online presence:

  - Online marketplaces – e.g. eBay, Amazon, solomarket.com.sb

  - Social media – e.g. Facebook, Instagram, TikTok, YouTube

  - Directories – e.g. skilledtrades.co.nz, fastfind.com.fj

  - Free email services e.g. gmail.com, outlook.com

  - Website – own brand e.g. auDA.org.au

  - Professional email – e.g. bruce@auda.org.au

Benefits of Pacific region ccTLDs

- Country Code Top Level Domains (ccTLDs) – two letter codes that act as a geographic identifier for local businesses

- Local ccTLDs (e.g. .nz, .sb, .fj, .tv, .vu, .ck, .tk) generally indicate that the business is local

  - Consumers can support local economy

  - Less time to deliver goods or services

  - Local support if something goes wrong with the product or service

  - Local law enforcement if product not delivered or doesn't work

- Less competition for good names in local ccTLD versus global spaces like .com

- An indicator to search engines and AI tools that the website is local

- A focal point for creating local content, local information, local goods and services

- Part of the brand identity of a country

- Contribute to the development of a local digital economy

Make local ccTLD an easy option

- Keep costs down

- Ensure ccTLDs available to use with common Internet services designed to make it easy to establish a website (e.g. Wix, Squarespace, Shopify)

- Ensure ccTLDs available to use with common email applications to establish a professional presence (e.g. Gmail, Microsoft 365)

- Large Internet service companies will generally work with a few large registrars that use highly automated systems to connect to Registries

Pacific region ccTLD challenges

- Most Pacific region ccTLDs have less than 10,000 domain names

- Have manual processes for creating local domain names

- Local infrastructure is not redundant – potential for disruption with natural disaster

- Local infrastructure is not resilient from cyber-attack – generally not running latest security features like DNSSEC

- No integration to large global service providers like Microsoft/Google email, or Wix/Squarespace/Shopify website builders.

- Lack of local support for small businesses and government services to get online

- Often significantly more expensive than alternatives like .com or social media

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Pacific Registry Framework

Pacific region ccTLD registry infrastructure

- An option is to consider using a common Pacific registry infrastructure framework that can

  - leverage international standards (e.g. EPP registry-registrar protocols, DNSSEC)

  - support large global registrars that are used by large Internet service companies

  - support local IT companies to provide registration services – local payment options

  - keep the cost per name down

  - Provide a reliable, stable and resilient DNS infrastructure – connect into global network of reliable DNS nameservers for maximum resiliency

  - Provide protections from cyber security attacks and various forms of DNS abuse

  - Able to continue operation during natural disasters including loss of International cable connection

Pacific ccTLD Registry infrastructure

Global network of registrars and IT service providers
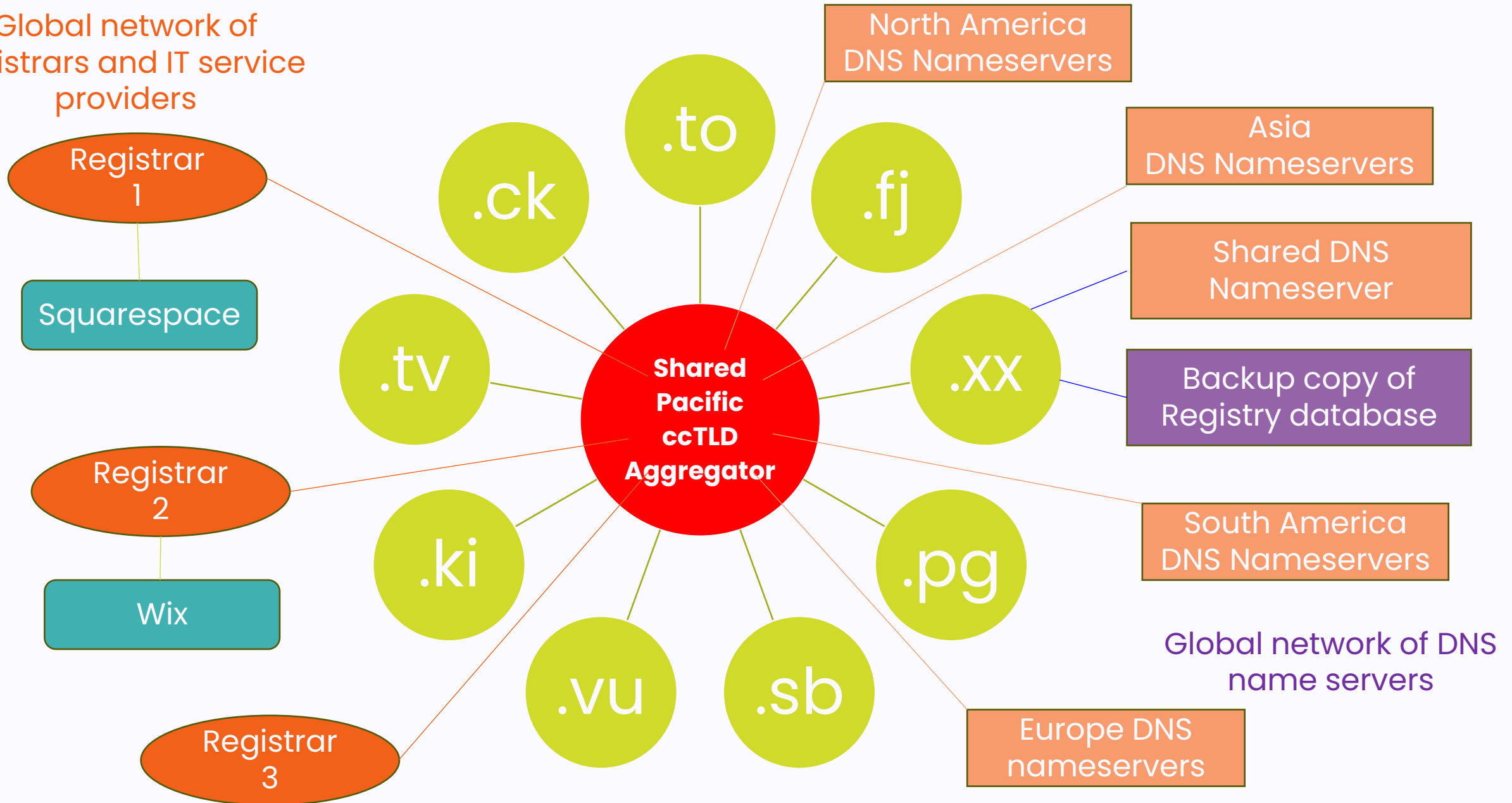
North America DNS Nameservers

Asia DNS Nameservers

Shared DNS Nameserver

Backup copy of Registry database

South America DNS Nameservers

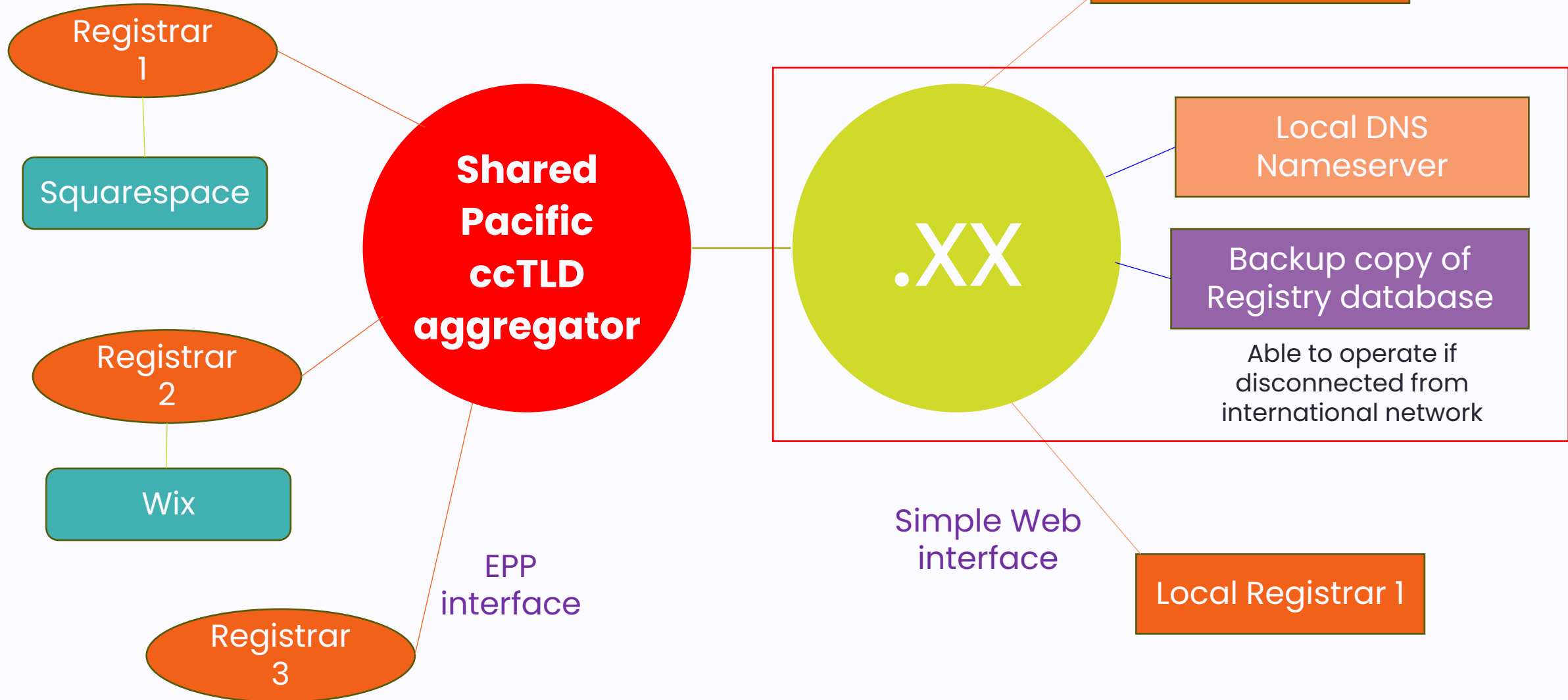Global network of DNS name servers

Europe DNS nameservers

Registrar 1

Squarespace

Registrar 2

Wix

Registrar 3

.to

.ck

.fj

.tv

Shared Pacific ccTLD Aggregator

.xx

.ki

.pg

.vu

.sb

Pacific ccTLD Registry Local infrastructure

Global network of registrars and IT service providers

Registrar 1

Squarespace

Registrar 2

Wix

Registrar 3

EPP interface

Shared Pacific ccTLD aggregator

Local Registrar 2

.XX

Local DNS Nameserver

Backup copy of Registry database

Able to operate if disconnected from international network

Simple Web interface

Local Registrar 1

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What could be funded?
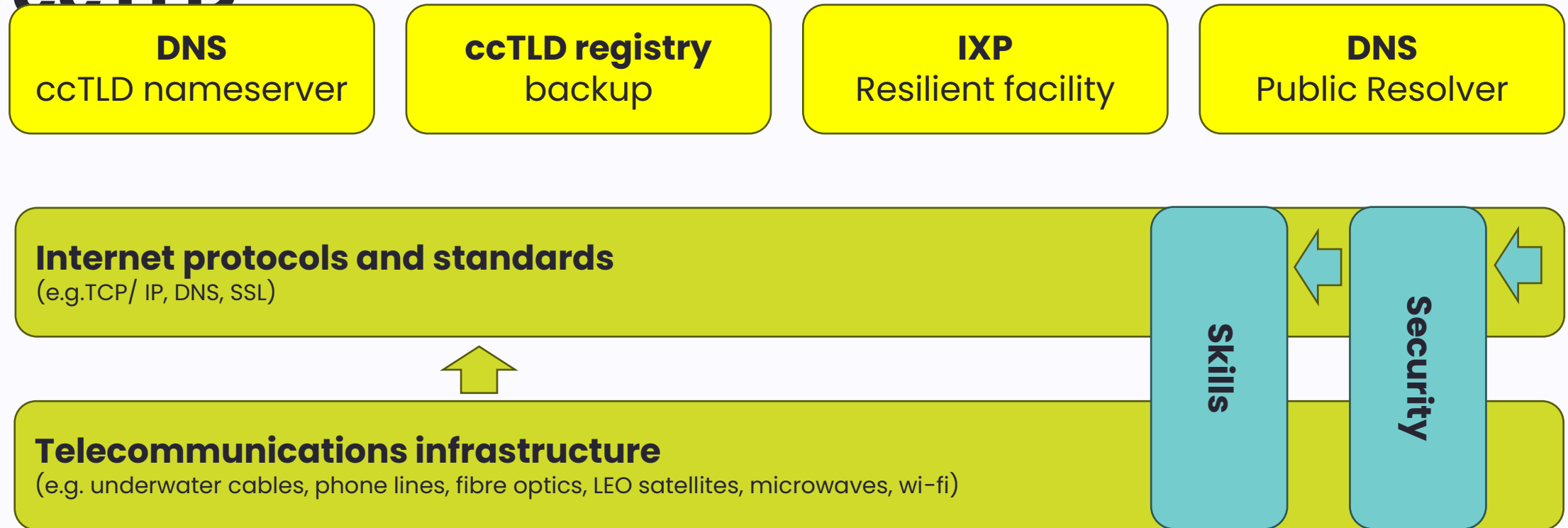
What could be funded?

- **Package of equipment for each country** for a **resilient local registry**

  - DNS authoritative nameserver for the local ccTLD (can hold DNS for other ccTLDs in region)

  - DNS public resolver – DNSSEC validating

  - Local Registry database primary server

  - Registry database backup and registry software backup

  - Internet Exchange Point (IXP) – connect broadband networks and content providers

  - Backup power – batteries, solar panels, diesel storage, diesel generators

  - Backup connections – e.g. Starlink connection

What could be funded?

- Assistance to set up local multi-stakeholder Internet community
  - Across Government, Business, Schools, Tertiary education, Not-for-profit, Civil society
  - Training – primary, secondary, tertiary
    - how to set up online presence
    - how to maintain ccTLD infrastructure
  - Establish local user groups
  - Assist for how to leverage Internet technologies for marketing – social media + Web + email

Key critical infrastructure services for local Pacific Island ccTLD

DNS
ccTLD nameserver

ccTLD registry
backup

IXP
Resilient facility

DNS
Public Resolver

Internet protocols and standards
(e.g.TCP/ IP, DNS, SSL)

Telecommunications infrastructure
(e.g. underwater cables, phone lines, fibre optics, LEO satellites, microwaves, wi-fi)

Skills

Security

Cost per Pacific Island

- Physical infrastructure footprint ~ $500,000 per node

  - Repeatable platform for each location

  - Shipping container environment

    - Back-up power – batteries, generator

    - Cooling – air-conditioning – redundant systems

    - Racks for equipment

    - Back-up connectivity – e.g Starlink connection

    - Secure – lock-up

    - Servers for DNS, Registry, WHOIS, back-ups

    - Internet routers and switches for Internet Exchange Point (IXP)

    - Space for third partyies to set up content servers and connect to (IXP)

- Assistance to set up local multi-stakeholder Internet community - $500,000 per node

  - Staffing, training materials, travel, train the trainer approach, regular visits, maintenance

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Elements of a Pacific ccTLD registry

Elements of a local Pacific ccTLD Registry

1. **ccTLD Registry System**

2. **WHOIS System**

3. **DNS System**

4. **Distribution channel**

5. **Names Policy**

6. **Complaints Process**

7. **DNS Abuse management**

1. Pacific ccTLD Registry System

- Registry contains the list of domain names, the DNS technical information for each name, and the name of domain name holder and contact details for the domain name holder

- Ideally local registry is reliable, secure, high performance and meets relevant Internet (IETF) standards

- Needs a sustainable operating model – revenue to cover costs, and surpluses to invest in better security and performance

- Industry standard Extensible Provisioning Protocol (EPP) used to connect registrars to the registry

2. WHOIS System

- Domain name holders need to be accountable for their use of domain names

- WHOIS provides information on the natural person or organization that holds the domain name

- WHOIS allows third parties to contact the holder of the domain name licence

- Allows law enforcement to enforce the laws of the country where the ccTLD operates

- Accurate information is key to building trust in the operation of the ccTLD and allows Internet users to see who is associated with a domain name

- Accuracy needs to be checked at time of registration, but also for the lifetime of the domain registration – which can last for more than 20 years.

- ccTLD need processes to establish and maintain accuracy

3. DNS System

- The DNS system is primarily used by Internet Service Providers (ISPs) that resolve domain names to IP addresses

- By design it is highly reliable and resilient

- This is the most critical service for a ccTLD to provide

- Many (or most) of the queries for domain names happen from outside of the country

- Large ccTLDs tend to operate an array of DNS nameservers spread across the major groupings of Internet users around the world (USA, Europe, Asia, South America, Africa)

- Opportunity to run a local DNS nameserver in country to build resilience in the event of an island becoming isolated (loss of Telecommunications connection) and also build local knowledge in operating a DNS nameserver

- Tap into a large network of DNS nameservers offered by other registry operators in the region (e.g. .au, .nz etc) – shared DNS infrastructure
  - Similar concept to the Latin American - LACTLD Anycast Cloud   (https://anycast.lactld.org/en/)

4. Distribution channel

- The global registry and registrar industry is highly consolidated

- In Australia – the top 6 registrars account for more than 90% of names, and 4 of those are large multi-national registrars

- ccTLDs will generally need to use common Internet standards for providing registrars with access to the registry and adhere to common business rules (e.g. length of registration, expiry processes etc) – as large registrars use fully automated systems

- Much of the income for smaller registries come from large corporates that will register in a ccTLD to protect their brand – but these corporates use one of a handful of registrars that serve the needs of large corporations

- There also needs to be support for local ISPs and local IT service companies to access the registry (often via a web interface) that are not global registrars but provide local support in the local language, and support the local payment methods

5. Names Policy

- Generally best to follow the business rules for the large global TLDs – e.g. .com as a benchmark in terms of length of registration and renewal processes

- Still room to define what names are allowed and how they can be used
  - Reserved lists – e.g. *Anzac* is reserved in Australia, names of international organisations
  - Local laws & culture – e.g. no gambling sites, no alcohol sites, lots of rugby and fishing sites

- Naming Policy should support the values of the country – e.g. faith, family, community, local traditions

- Naming Policy should have acceptable use policies – e.g. obey the laws of the land, don't use domain names for DNS Abuse – Phishing and Malware

6. Complaints Process

- If you have a naming policy or acceptable use policy, a ccTLD will need a complaints process to enforce the rules

- May also want a dispute resolution process for trademark disputes between registrants – e.g. use organizations like WIPO (World Intellectual Property Organization)

- A key part of trust in a namespace is having an effective complaint handling system

7. DNS Abuse management process

- ccTLDs with no naming policy or complaint policy often become a haven for illegal activity that can damage the reputation of the country

- Managing DNS Abuse is a combination of:
  - Proactively monitoring daily registrations for unusual activity – e.g. contact names that don't appear to correlate to the name of the domain name holder, or unusual email addresses that don't seem to align with the name of the registrant contact
  - Reviewing DNS threat intelligence feed for names in a particular ccTLD and following up with registrars and registrants

- If malicious registrations are detected at the time of registration, the most likely DNS Abuse left is hacked small business websites – usually as a result of poor patching management of the operating systems, content management system (e.g. WordPress), or plugins

- Generally recommend training for local community to apply basic security controls – such as the ASD *Essential Eight* – e.g. patching, two-factor authentication, backup etc.

https://www.cyber.gov.au/resources-business-and-government/essential-cyber-security/essential-eight

What next?

- **Remind consumers to** 'check **for the local ccTLD**' and why they should care.

- **Build awareness** of benefits of a professional looking email address and websites versus alternatives such as social, media, directories and online directories

- **Demonstrate how easy it is** – build capacity and confidence in the local community – many tools available – e.g. you can use AI to automatically generate a website.

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