

## ISLAND OF NIUE



CASE STUDY

SWITCHVOX

### OVERVIEW

**They service some of the most remote places on Earth — islands in the Pacific Ocean where you would not find a mobile phone network at all, or the Internet readily available — that is, not until Challenge Networks took Asterisk to a whole new level.** In the past four years, Challenge Networks, as part of its portfolio of carrier network solutions, has developed several Asterisk solutions utilizing the emergent open source software for use within many telecom companies in the Pacific Island region including Papua, New Guinea; Samoa; the island country of Vanuatu; and now, the island nation of Niue.

### **The Power of Asterisk Reaches the South Pacific, Connecting Obscure Island Nations with the Rest of the High-Tech World**

Located 1,500 miles northeast of New Zealand amidst a triangle formed by Tonga, Samoa, and the Cook Islands, the 100-square-mile self-governing nation of Niue is home to as many as 2,000 residents, most of whom are Polynesian islanders. In 2003, an entrepreneur, concerned that having no access to the Internet was a detriment to Niue's economy, took steps to make Niue the first island nation to use Wi-Fi nationally by providing it free to the public on a limited basis through funds obtained from the domain name registrations of '.nu'. In 2004, a devastating cyclone destroyed most of the island's infrastructure, including the local hospital and hotel. The hit drastically crippled the island's primary means of income — tourism.

In hopes of boosting tourism and connecting the island technologically with the rest of the world; in 2010, the New Zealand government donated funds to replace and upgrade as much of Niue's telecommunications infrastructure as possible, including its old public switched telephone network (PSTN). Challenge Networks, a preferred Asterisk reseller and telecommunications network integrator located in Melbourne, Victoria, Australia developed the most flexible solution.

Challenge Networks had successfully rolled out PSTN, mobile, and data networks to more than 15 countries, and had installed Asterisk, the world's most widely used open source communications platform, many times. The Niue project would be a unique opportunity to utilize the power of Asterisk to provide several of the key network components. It would prove to be no easy task.

“The project was fraught with logistical complications,” says Kamal Al-Sabbagh, Challenge Network’s senior solutions architect, “The technical challenges alone were threefold. First, it was difficult to provide Niue Telecom with the latest in Next Generation Network (NGN) architecture, and replace the existing infrastructure with the limited funding provided. Also, we had to build a network that the local staff could maintain; and finally, the region is subject to serious weather, so we had to make the new infrastructure cyclone-proof, to avoid the kind of destruction they endured in 2004.”

The Challenge Networks team organized a site visit and investigational review of the project in July 2010. “The outcome of that initial visit was worrying,” Al-Sabbagh admits. The island’s only telecom provider, Niue Telecom, operated on 1980s technology, making it nearly impossible to find technical support and spare parts when the equipment broke down. Their legacy TDM/PSTN had limited capacity, and pieces of the infrastructure used protocols like the Multi-frequency Compelled Region 2 Signaling System (MFC/R2) and Signaling System 5(C5), which are based on analogue technology that is 50 years old. Furthermore, their still-operational PBX dates to WWII. “This may be hard to believe,” muses Al-Sabbagh, “but at this moment, they are still using that PBX, although we expect to decommission it in the near future as part of their migration to Asterisk.

“The NZ government allocated funds were barely enough to install a new transmission system and replace the PSTN with Multi Service Access Node (MSAN), which would provide both voice and ADSL for PSTN subscribers. However, for the PSTN to function properly, it would take a full ten percent of the budget to find a mainstream vendor softswitch,” says Al-Sabbagh. The site visit also highlighted several other requirements not included in the initial estimates for project scope and budget, including the need to replace the ailing AMPS cellular network, and Niue’s International voice Gateway (IGW).

As Al-Sabbagh explains, building an IP infrastructure from scratch on a remote island in the middle of the ocean, 3½ hours by airplane from the nearest metropolitan city, presented its own set of problems. For one, it took many boxes to get all the equipment, tools, and supplies to Niue. “There is only one flight per week from Auckland, New Zealand and by boat it could take a month,” he says. “If you suddenly discovered you needed a special kind of screw or a different tool, you had to wait a week for the next flight. If you required any remote support or extra personnel, it is very expensive to fly them in for one or two days of work. To add insult to injury, by plane, you are traveling back and forth across the International Date Line, which gets very disorienting over time.”

## THE ASTERISK SOLUTION

The Challenge Network team could not have made the project work within the budget given, had it not been for Asterisk. “We focused our design around Asterisk and utilized the power and flexibility of open source software everywhere it was possible,” Al-Sabbagh admits.

Challenge Networks and Asterisk was able to deliver Niue a fully converged, state-of-the-art NGN with voice and data network, an Internet Service Provider (ISP) module, Internet access to every home, and IP-based solutions across the board. Asterisk offered the perfect solution for the following reasons:

- Due to budgetary constraints and very costly logistics, Asterisk empowered Niue Telecom to maintain their own system without the need of an outside vendor or support mechanism. Also, ongoing operating expenditures (OPEX) were significantly reduced, which was a key consideration.
- Because Asterisk software and the open source model is without cost, it freed up funding for replacing all their existing telecommunications systems, including the mobile network and international gateway.
- The installation of a new 2.5G cellular network (Voice, Data/EDGE) from LEMKO leveraged mobile capabilities. All IP architecture was included and integrated with Asterisk, which replaced the AMPS system (with a remaining capacity of up to three simultaneous calls), so it now reaches Niueans all across the island (with a new capacity of 112 simultaneous calls).

By implementing Asterisk to run all of Niue's PSTN, its flexibility has solved many problems:

- Niueans now have number portability around the island utilizing Asterisk as a softswitch for the MSAN with real-time MySQL subscriber provisioning, and Call Detail Record (CDR) collection.
- Asterisk provides Round-robin (RR) queues for PBX customers.
- Asterisk saves a lot of money providing an international Gateway with IAX/SIP trunks for international dialing with G.729/G.723/G.711/T.38 support. This means traditional carriers no longer dictate cost.
- Asterisk supports a SIP-MFC/R2 conversion that supported the legacy AMPs mobile network while it was being migrated out to the new all-IP network, helping to ease the transition from the antiquated older system, over to the new system, eliminating the risk of critical error.
- Asterisk provides a Call Center PBX for the Network Operations Centre (NOC), where the International operator and Operator Assisted Calls (OAC) originate.
- Open source enabled source code modifications to be made that allowed the successful integration with legacy protocols and systems, which was especially important during the implementation.

According to Al-Sabbagh, Niue, with its newly implemented NGN, has taken a quantum leap in terms of technology. The biggest challenge he sees the island nation now facing, is maturing to the idea of having the power of IP and the Internet readily available. "We expect as the fiber cable around the island is complete, enabling the Niueans to have Fiber to the Curb (FTTC), the ADSL network will catch on. Then more people will have Internet in their homes, more businesses will start exploring the power of Asterisk, and IP-PBX's will be more in demand."

Al-Sabbagh sums up the beauty and power of the Asterisk solution. "It is not often in your professional career when you get to design and replace all facets of a country's telecommunications infrastructure. It is highly satisfying when you integrate technologies and ideas from a variety of vendors into a unique offering that directly and positively affects a nation."



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