

AUG 22 2016

Policy Division  
International Bureau

**Factors Influencing Routing of Submarine Cables and Landing Sites**

**Granted**

**date** August 22, 2016

**authorized by** Chief, Telecommunications  
and Analysis Division, International Bureau

**signature** *Hemmi Coca*

**Expires:** February 17, 2017

**Economic opportunities**

*(Also needs telco or OTT input on how capacity demands are determined)*

The submarine cable landing site is selected primarily on the basis of access to the carrier's Point-of-Presence (POP) or network access to a cloud exchange service provider, and where capacity demand and rates are economically most attractive. This usually means access to a large metropolitan area, city, or region. The demand may also result in several competing cables landing in the same metro area. Alternatively, private network operators may be driven by owning their own submarine cable or fiber pair in order to control costs and security. For these cable owners, access to their private data centers is the driving consideration which may be located away from a large metropolitan area.

Cost of construction is driven by submarine cable length from landing point to landing point, length of the continental shelf where cable must be armored and buried (which is more costly than cable and installation in deep water), access to existing terrestrial cable infrastructure including outside plant cable (OSP), cable station, and backhaul from cable station to POP or cloud exchange. A landing site resulting in a short OSP route to cable station or cloud exchange will be more economical. Many purchasers may choose sites with existing shore end infrastructure and network access. Thus cables are congregated at or near the same landing, if not in the same beach manhole, which is often the case.

If capacity demand is high enough in a region to support the business case, development of a new landing site may be undertaken requiring new investment in seabed leases, beach and OSP land leases, and OSP and cable station construction. Income must be sufficient to cover construction and O&M costs within the required payback period.

The business case on the investment is also driven by duration of the project. Projects undertaken in areas and states where regulatory and permitting times are long, may be less attractive than sites that can be permitted more quickly.

Requirements for route redundancy (to provide network resilience and higher availability) drives requirements for multiple diverse routes.

Operational costs including long term annual lease of seabed, landing site properties, security, staffing, and maintenance and repair costs are also factors influencing the selection of a landing site and cable route. This is factored into the business case.

On the US East coast, existing landing sites are clustered in the Northeast including MA, RI, NY, NJ and in the Southeast along the FL coast in three primary locations.

On the US West Coast, existing landing sites are located in Northwest in WA and OR and in the Southwest in southern CA.

Landing sites connect Alaska to the US mainland and Hawaii to the US mainland.

In almost all cases, landing sites are developed to support multiple submarine cables.

## XSite Section Title

*What is the impact of an outage – lack of connectivity, loss of revenue, etc.*

*Causes of an outage – Terrorists, hurricane, seismic event, power failure, backhoe, anchor, dry plant failure*

Since the selection of the landing point is largely dictated by economic opportunities, the trend of clustering is likely to continue. Avoiding failure scenarios at the landing point is going to become more and more critical, and there should be implementable strategies to reduce the risk of an outage or disruption when clustering cannot be avoided. It is important when discussing cable system vulnerability that the need for diversity, redundancy and resiliency of new cable systems is balanced with economic challenges. It should be noted that the cost for many of the recommendations to reduce vulnerability and increase reliability at the landing point are a relatively small percentage of the system cost. When looking at implementable strategies, this section will review opportunities to achieve diversity, redundancy and resiliency to achieve reduced vulnerability for cable systems.

### Diversity

Routing diversity is a fundamental concept that should be employed by new cable systems. In fact, route diversity and all of its manifestations should be considered industry "Best Practices". Route diversity is generally defined as the routing between two points over more than one geographic or physical path with no common points. While there are cost and regulatory considerations to diverse paths as discussed in Report #1, this section will focus on methods of increasing diversity at the landing point. End point separation, by adding diversity at the landing point, is ideal to reduce vulnerability.

When discussing diversity in cable system landing points there are several routing elements to achieve diversity including:

- Beach Manhole (BMH)
- Outside Plant (OSP)
- Cable Landing Station (CLS)

### Beach Manhole

The Beach Manhole is a concrete chamber, buried into the beach ,or road behind the landing point, where the submarine cable is terminated and from where the OSP fiber cable and power cable are routed to the cable station. Most manholes are designed to take more than one cable, most commonly two. Additionally, landing points with clustered cables may see multiple beach manholes in proximity to each other. While these two situations are cost effective, it may not reduce the risk of failure as a single localized event could disrupt multiple cables such as a beach wash out due to a hurricane or due to backhoe damage across two cables at the same time. Risk may be mitigated with limiting the number of cables per manhole and requiring minimum distances between manholes.

## Outside Plant (OSP)

We define OSP as the conduits, fiber cable, and power cable between the BMH and eh cable station. Diverse outside plant routes between the BMH(s) and the CLS(s), are valuable to reducing vulnerability either by man induced hazards, (digging), or natural hazards (flooding or wash outs).

## Cable Landing Station

The cable landing station is a building that provides the enclosure, power and cooling required for the power feeding equipment (PFE) and submarine line terminal equipment (SLTE). For enhanced reliability diverse routing could also employ distinct termination equipment as this would mitigate the vulnerability of a common single point of failure at either end of the connections.

The decision to land a new cable into an existing cable landing station is heavily influenced by available station capacity, contracted landing party, and schedule due to permitting processes. However, this leads to system vulnerability as a station failure may cause catastrophic conditions. Outages may occur due to terrorist acts, natural disasters, power failures, and equipment failure within the station.

There are ways to mitigate risk including dedicated cable landing stations for each system or isolated space, power, and cooling for each system within a shared cable landing station.

## Redundancy

After all efforts have been made to provide redundancy using physically diverse routes as noted above, reliability may be further reduced by including appropriate levels of redundancy within the cable landing station. While there is redundancy built into most systems within the cable landing station, the submarine cable industry has not adopted a standard set of criteria. The data center industry, for example, has embraced Uptime Institute's standard Tier Classification Systems and/or the Telecommunications Industry Association's TIA-942 to design and classify redundancy in new or existing data centers. Cable landing station costs and operational complexities may increase with adoption of a standard; however, it would dramatically increase the overall reliability of cable systems.

## Resiliency

After diversity/redundancy strategies have been implemented, it is up to each system component to resist a particular threat. Methods of increasing a component's resiliency are critical to maintaining reliability. [Use of the term "resiliency" in this context is the ability of the individual submarine cables, shore infrastructure, OSP, or cable station to resist damage or failure or else have the ability to be quickly (or quickly enough) repaired and returned to an operating states. "Network resiliency" makes uses of redundant segments to reroute telecom traffic if one segment is failed.

## Wet Plant

Examples that make the wet plant "resilient" are cable routing to avoid hazards, cable burial and armor to protect it from anchoring or fishing gear, and cable awareness and charting efforts to prevent potentially damaging encounters in the first place. In summary these include:

- Armored Cable
- Trenching and burial
- Routing

- Cable Awareness Programs.

#### Dry Plant

The cable landing station is the primary means of protecting the dry plant from threats, below are the areas of the CLS that must be considered

- Protection from physical threats (intrusion, ballistic, surveillance)
- Protection from natural disasters (fire, lightning, wind, flood, seismic)
- Quality of space within the station. Recycled not bespoke spaces. (need more here, equipment failure due to poor quality of station workmanship, specifications?)

## Question 10

### *Introduction*

Sangoma U.S., Inc. ("Sangoma U.S."), by its attorneys and pursuant to Section 63.25 of the Commission's Rules and Regulations, 47 C.F.R. § 63.25, hereby respectfully requests an extension of its Special Temporary Authority ("STA"), granted for a 180-day period on February 17, 2016, to provide service to customers, pending consideration of and final Commission action on a previously filed International Section 214 authorization application and a Domestic Section 214 authorization application.<sup>1</sup>

Sangoma U.S. requested the STA it now seeks to extend, as well as domestic and international Section 214 authority, to remedy telecommunications regulatory oversights; namely the failure to timely notify the Commission of Sangoma U.S.'s acquisition of SIPStation Inc. ("SIPStation") and RockBochs Inc. ("RockBochs"), subsequent internal mergers of SIPStation and Rockbochs into Sangoma U.S., and the failure of Rockbochs and SIPStation to seek prior international Section 214 authorization. Accordingly, Sangoma U.S. seeks extension of this STA to authorize its continued operations while its Section 214 applications are considered by the Commission. Further, Commission action on both the domestic and international Section 214 applications has been deferred because the U.S. Department of Justice ("DOJ"), U.S. Department of Defense ("DOD"), and U.S. Department of Homeland Security ("DHS") (i.e., the Executive Branch Agencies participating in a working group informally known as "Team Telecom") have intervened and are reviewing the application for any national security, law enforcement, and public safety issues potentially associated with this matter.<sup>2</sup> That review remains ongoing.

The STA extension is requested for a period of 180 days or until such time as the Commission has taken dispositive action on the underlying applications for Section 214 authorization. Sangoma U.S. acknowledges that a grant of this STA will not prejudice any action the Commission may take on the underlying Section 214 applications. Sangoma U.S. further acknowledges that this STA can be revoked by the Commission upon its own motion and without a hearing.

### *Background*

Sangoma U.S. is a Delaware based corporation whose parent entity is Sangoma Technologies Corp. ("STC.V"), a Canadian publicly listed Company. STC.V manufactures and sells hardware and software components that enable or enhance IP Communication Systems for voice, data, and video applications.

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<sup>1</sup> Sangoma U.S. requested international Section 214 Authority on September 18, 2015, Sangoma U.S. requested domestic Section 214 Transfer of Control Authority and domestic and international Section 214 STA on December 23, 2015, and was assigned docket WC Docket No. 16-11. Sangoma U.S. supplemented its request for domestic Section 214 Transfer of Control Authority and domestic and international Section 214 STA on January 19, 2016. Sangoma U.S.'s request for domestic Section 214 STA was originally granted on February 18, 2016 for a period of 60-days. The Commission has granted two 60-day extensions of Sangoma U.S. domestic Section 214 STA, on April 15, 2016 and June 17, 2016. Sangoma U.S. filed another request for extension of its domestic Section 214 STA on August 15, 2016

<sup>2</sup> See Letter from B. Paz, United States Department of Justice, National Security Division, to M. Dortch, Secretary, Federal Communications Commission (filed Mar. 8, 2016) (filed in WC Docket No. 16-11).

On January 1, 2015, Sangoma U.S. acquired SIPStation Inc. ("SIPStation") and Rockbochs Inc. ("Rockbochs"). SIPStation, based in Wisconsin, was established to provide an integrated SIP trunking service. Rockbochs, based in Minnesota, offered fax-over-IP service and supporting hardware. With the exception of Sangoma U.S.'s current telecommunications service offerings (i.e., those telecommunications services formerly provided by SIPStation and Rockbochs), which STC.V provides solely by virtue of its status as the ultimate parent owner of Sangoma U.S., STC.V does not provide any telecommunications services in any country, nor is STC.V affiliated with any other telecommunications providers. The international services provided by each acquired company, and now by Sangoma U.S., are *de minimis* and Sangoma U.S. does not have market power in any country.

#### Transfers of Control

Prior to the acquisitions of SIPStation and Rockbochs (the "Acquired Companies"), the Acquired Companies were 100% U.S. owned and had not previously experienced a substantial transfer of control. Thus, they had not been required to obtain domestic Section 214 licenses.<sup>3</sup> Pursuant to the FCC's rules, however, prior to Sangoma U.S.'s acquisitions of SIPStation and Rockbochs, applications should have been filed seeking FCC prior approval for the substantial transfers of control.<sup>4</sup> Nonetheless, because Sangoma U.S. was not aware that domestic applications were required for each transfer of control, the required applications were not filed.

In reviewing the operations of the Acquired Companies as part of the DOJ Triage Question preparation it was also noted that there was a *de minimis* amount of international long distance traffic being carried. While both the Acquired Companies had a U.S. focus, they both resold services from carriers that offer international long distance. A complete review of 2015 transactions for the period January 1 to September 30 found that the fees charged by the Acquired Companies relating to international long distance were less than 1% of the Acquired Companies' total billings. Nevertheless, the Acquired Parties had not obtained international Section 214 authorizations,<sup>5</sup> and thus, there were no international Section 214 authorizations in place at the time of the acquisitions for which Sangoma U.S. could have sought transfers of control, even had Sangoma U.S. been aware of such an obligation.

#### Assignments

Sangoma U.S. also did not notify the Commission following what would have been *pro forma* assignments of international Section 214 authorization, had SIPStation and Rockbochs initially obtained international Section 214 authority and approval for the substantial transfers of control.<sup>6</sup> The

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<sup>3</sup> See 47 C.F.R. § 63.01(a) ("Any party that would be a domestic interstate communications common carrier is authorized to provide domestic, interstate services to any domestic point and to construct or operate any domestic transmission line as long as it obtains all necessary authorizations from the Commission for use of radio frequencies.").

<sup>4</sup> See 47 C.F.R. § 63.04 (describing the filing procedures for domestic and joint domestic/international applications for transfers of control).

<sup>5</sup> See 47 C.F.R. § 63.18 (requirement to apply for authority to provide international service).

<sup>6</sup> See 47 C.F.R. § 63.24(f).

Commission does not require notification for the *pro forma* assignment of domestic Section 214 authorization.<sup>7</sup>

Sangoma U.S. regrets its part in the failure to seek prior Commission approval for the international and domestic transfers of control of SIPStation and Rockbochs. Sangoma U.S. also regrets its failure to notify the Commission of the international *pro forma* assignments of authorization when it merged those entities into Sangoma U.S. Failure to submit the required applications and notice in connection with these transactions was an oversight that occurred due to lack of familiarity with the Commission's Section 214 rules. Sangoma U.S. has reported these transactions now, and sought the requisite international and domestic Section 214 authority, because it understands the importance of compliance with U.S. telecommunications regulations and wants to assure the Commission of its intent to operate as a good U.S. corporate citizen. Sangoma U.S. has worked diligently with counsel to gather the information necessary to prepare the required international and domestic Section 214 applications and the corresponding requests for STA. The company also intends to put in place internal monitoring controls and to work with its current counsel to ensure full compliance with FCC licensing requirements in the future.

#### *Public Interest Statement*

An extension Sangoma U.S.'s STA to authorize continued operations would be in the public interest because it would avoid disruption of service to Sangoma U.S.'s 1,700 business customers. In addition, granting Sangoma U.S.'s STA extension request is consistent with Commission precedent.<sup>8</sup> The Commission does not typically deny STAs where they are the result of unintentional error, especially where such denial would mean disruption in valuable services provided to the public. Rather, the FCC International Bureau has granted such requests in cases where previously undisclosed foreign ownership amounted to control of the licensee.<sup>9</sup>

Sangoma U.S.'s failure to seek and obtain the required international and domestic authorizations was not done deliberately and no harm to customers has resulted from the transactions outlined in this

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<sup>7</sup> See 47 C.F.R. §§ 63.03(d) (blanket authorization to transfer or assign a domestic Section 214 authorization in case of a corporate restructuring that does not result in change in ultimate control), 63.24(f) (requirement to notify the Commission within 30 days of *pro forma* transfer or assignment of an international Section 214 authorization).

<sup>8</sup> In two related actions, the FCC granted a domestic 214 STA to Diller Telephone Company ("Diller") and an international 214 STA to its subsidiary Diode Telecom Inc ("Diode"). See *Diller Telephone Co.*, Request for Domestic Section 214 Special Temporary Authority, WC Docket No. 14-224 (filed Nov. 20, 2014) (stamped with WCB grant of authority) ("Diller Domestic Request"); *Diller Telephone Co.*, International Section 214 Special Temporary Authority Application, IBFS File No. ITC-STA-20141118-00301 (FCC IB granted Nov. 26, 2014). These applications were granted three years after Diller acquired Diode and failed to seek authorization for the transfer or notify the Commission. See Diller Domestic Request at 1-2 (underlying transactions took place in March, 2011).

<sup>9</sup> See *Public Notice*, DA 12-543, at 3 (FCC IB rel. Apr. 5, 2012) (granting application for assignment to One World Telecom, LLC under IBFS File No. ITC-ASG-20110812-00261); see also *Public Notice*, DA 12-1842, at 3 (FCC IB rel. Nov. 15, 2012) (approving increased foreign investment transferring control of Verscom LLC under IBFS File No. ITC-T/C-20120203-00040); *Public Notice*, Authorizations Granted, DA 07-3472, 22 FCC Rcd 13894 (FCC IB rel. July 30, 2007) (granting applications of Satamatics, Inc., Satamatics Worldwide Limited, and Satamatics Global Limited for consent to transfer control of licensees and authorizations, including a Section 214 authorization under IBFS File No. ITC-T/C-20070319-00113).

attachment. STC.V, Sangoma U.S.'s ultimate parent owner, is a Canadian company and, until recently, its senior officials had limited knowledge of U.S. telecommunications and licensing law.

As previously mentioned, Sangoma U.S. is taking steps to avoid such FCC regulatory compliance failures in the future. It has engaged telecommunications counsel and has been briefed on the types of transactions that require FCC notification and approval. Sangoma U.S. will consult telecommunications counsel in the future regarding any sales and/or acquisitions of telecommunications assets and any significant changes in company equity, ownership, or voting control.

#### Questions 12 through 14

The answers to these questions are contained in Sangoma U.S.'s pending international Section 214 authorization application. See IBFS File No. ITC-214-20150918-00222. In accordance with the instructions contained in item eleven of the STA application, we do not include the answers to these questions again in this attachment.

#### Question 16

Sangoma U.S. provides the following responses to paragraphs (d), (e)(3), and (g) of Section 63.18:

63.18(d): Sangoma U.S. has received domestic Section 214 STAs to provide domestic service and international Section 214 STA to provide international service. Sangoma U.S. received international Section 214 STA on February 17, 2015 for a 180-day period. Sangoma U.S. received domestic Section 214 STA on February 18, 2016 for period of 60-days. Sangoma U.S.'s domestic STA was extended on April 15, 2016 and June 17, 2016 for additional 60-day periods.<sup>10</sup> However, Sangoma U.S. has not previously been granted either domestic or Global Resale international authority under Section 214.

63.18(e)(3): Sangoma U.S. will provide SIP dialtone service for customer PBX connectivity, and store and forward FAX service. Sangoma U.S. thus requests Global Resale Authority to operate as a resale carrier pursuant to Section 63.18(e)(2) of the Commission's rules. 47 C.F.R. § 63.18(e)(2). Sangoma U.S. will comply with the terms and conditions contained in Sections 63.21 and 63.23 of the Commission's regulations. 47 C.F.R. §§ 63.21, 63.23.

63.18(g): Not applicable. Sangoma U.S. does not seek facilities-based authorization.

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<sup>10</sup> Sangoma U.S. filed a third request for extension of its domestic Section 214 STA on August 15, 2016.



**Question 15**

The information requested for Attachment 2 has already been submitted to the Commission as part of Sangoma U.S., Inc.'s pending international Section 214 authorization application. See IBFS File No. ITC-214-20150918-00222. In accordance with the instructions contained in item eleven of the Special Temporary Authority application, we do not resubmit this information.