ConnectSuperior
Fiber Network Equipment and Services

Part B. COS Systems Open Access Solution Description

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1 Executive Summary

COS is the global leader in automated open access software with over 200 Service Providers and 1 million+ subscribers connected through our platform across 10 countries. COS' software was established in 2008, making it a first of its kind software for open access automation. The platform has allowed multiple service providers, and types of services to be chosen over a user marketplace in Europe nearly a decade before US communities and has been automating and enabling wholesale services for Fiber to the Home network operators since its inception. On COS' most mature networks 150 service providers of various types of services promote their offerings to end users on our customer full-service marketplace.

COS is rooted in municipal fiber to the home, and the vast majority of COS customers are government-owned operators or electricity utility companies building and operating FTTH infrastructure through open access in both Europe and the US. Our first US network deployed with COS Business Engine is a utility owned and operated network that has been utilizing our system since early 2016. KPUDbroadband

COS' value is that we focus on the core software to enable a truly automated and scalable open access network. Our platform is integrated with the hardware solution of your choosing and can support all kinds of environments, independent of architecture, including PON or Ethernet Point-to-point implementations. COS' software is built to provide network operators automation and a state-of-the-art user experience without limits to architecture or hardware choices. We integrate with vendors HW/SW (via ONT for provisioning of services, monitoring, etc.) COS provides the full order to billing functionality with rating and invoicing details/specification and then integrates with ERP for the wholesale invoicing and cash management in the ERP system.

COS truly believes in best of breed strategy and provides a world leading software solution to automate open access Networks. A wide range of integration capabilities with hardware/software vendors as well as partners to operate these networks. This creates stability in the business and maximizes our customers' flexibility to grow fast and scale over time. We provide flexibility and choice not just for ISP's but for operators and architecture.

2 Diagram of Proposed Solution

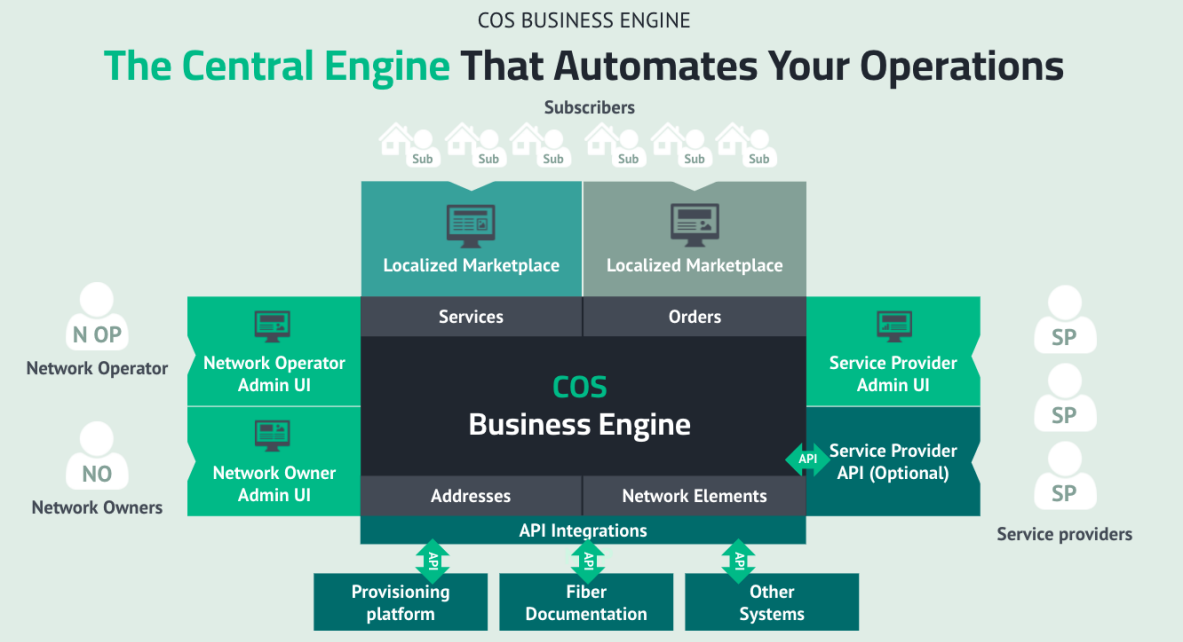
An End-to-End Software for FTTH Operators with Native Open Access Support

COS automates the complete commercial and technical process in FTTH rollouts to “zero touch” so customers can buy broadband online and start surfing seconds later.

We enable FTTH operators to maximize utilization of the infrastructure to all available service providers. The open access software orchestrates the network and all involved parties (end-customers, service providers, network operators) and service providers can manage their offerings and operate their customers.

This is key to improving ROI in fiber rollouts - increasing revenues and lowering the cost results in being able to provide affordable fiber to the home to everyone, even in challenging areas.

Figure 1. Overview of COS Business Engine in an automated open access Network



The entire COS platform is web-based and hosted on the Azure platform. It allows access for all different users in the open access ecosystem with tailored access to information and functionality based on their user profile. Via several integration methods other systems

can be connected. The customer/subscriber facing web interface is built to be quick and easy to customize.

Based in Sweden with operations in the US, COS Business Engine has a team of Swedish developers that have supported the development of the platform since its inception in 2008. We have SLA's for support and a process for tickets and custom development. Our staff has been dedicated to improving the efficiency and operations of the open access business model for almost two decades. Although the model seems innovative and new in the US - Sweden, much of Europe and South Africa have adopted it as the leading model for broadband and FTTH networks. In fact, through the model Sweden has reached 97% FTTH coverage, even though the population density is approximately half of what it is in the USA, and has lower broadband costs, more competition and average network take rates that exceed 70%. When discussing open access the most true model quoted is most often the "Swedish Model".

3 Detailed Bill of Materials

	TABLE 1. ONE-TIME ONBOARDING PROJECT FEE		Unit Price	Qty	Extended Price
	COS Business Engine one-time fee for project management, setup, configuration and training, including automated provisioning.	COS Systems	$ 72,500.00	1	$ 72,500.00
				Sub Total	$ 72,500.00
				ONE-TIME FEE	**$ 72,500.00**

	TABLE 2. MONTHLY FIXED RECURRING SUBSCRIPTION FEE		Unit Price	Qty	Extended Price
	COS Business Engine Maintenance and Support Base Fee (covers cloud hosting, software maintenance, upgrades and usage support)	COS Systems	$ 2,375.00	1	$ 2,375.00
	COS Demand Aggregation and Survey Module Base Fee within Douglas County	COS Systems	$ 625.00	1	$ 625.00
				Sub Total	$ 3,000.00
				TOTAL FEE	**$ 3,000.00**

	TABLE 3. MONTHLY VARIABLE RECURRING SUBSCRIPTION FEE (BASED ON ASL)		Unit Price per ASL	Qty	Extended Price per ASL
	ASL Fee, Active Service Locations	COS Systems	$ 1.81	1	$ 1.81

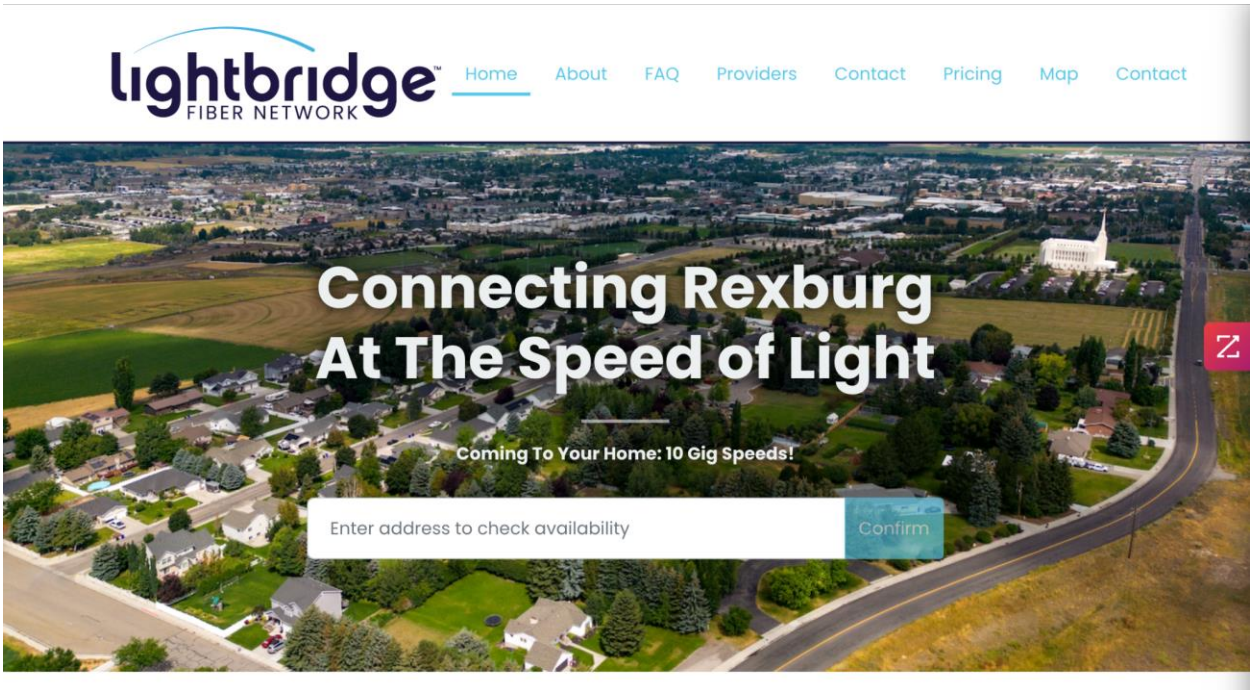
	TABLE 4. PROFESSIONAL SERVICES & SUPPORT FEES				Fee per Unit
	Premium support and professional services. Advanced Product support or consultancy work. Min. 1h per support ticket/work item.	COS Systems			$275.00 / hour
	Standard support. Email support. Response within 24 hours on business days (response requires less than 15 minutes to prepare).	COS Systems			included

4 Description of the Proposed Solution

The COS Business Engine software is based on an end-to-end system starting with survey and demand aggregation to customer signup, installs and operations. Before the network is built, geographical areas and smaller “community zones'' are the typical means to show the future subscribers what services will be available on the network at their location, while already installed service locations will be tied to “groups” that share the same offering and could also have a unique Marketplace with local market customization features. Every Service Location that is installed will have an ONT documented, including its connections higher up in the network. Customers will choose a service from the marketplace, and through COS’s integration to your hardware vendor, that service will be activated automatically.

4.1 Demand Aggregation

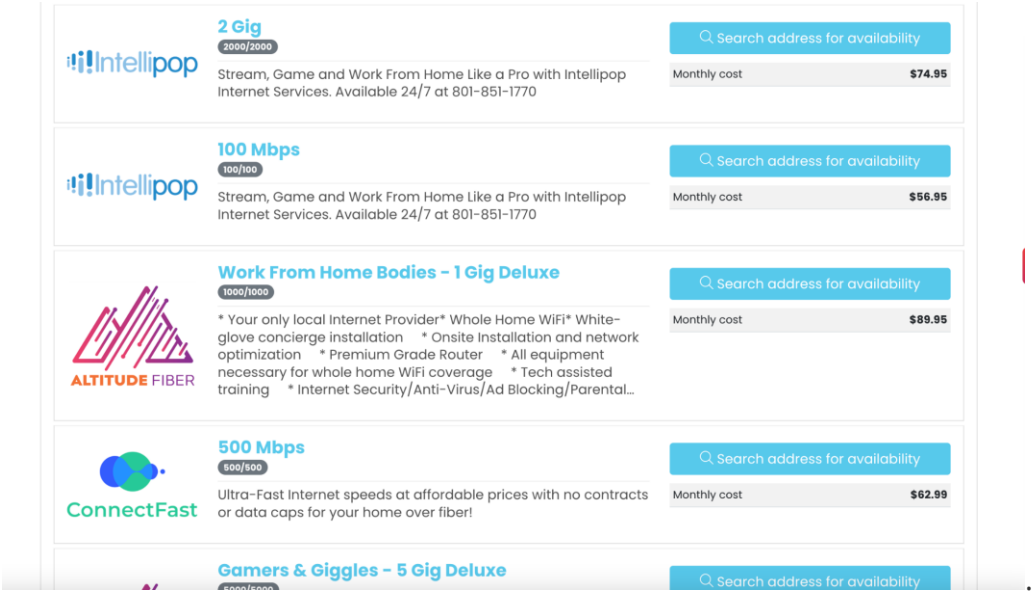
Demand Aggregation has been at the core of COS’s US products since 2012 with the launch of COS Service Zones. With our demand Aggregation platform you can determine address availability, take a survey, and even pre-sign up and submit a deposit. Customize your webpage to your community allowing citizens the local network feeling.



4.2 Self Service Marketplace

COS Business Engine is purpose built for open access and allows the subscriber to not only choose one provider at a time, but can actually buy services from multiple providers at the

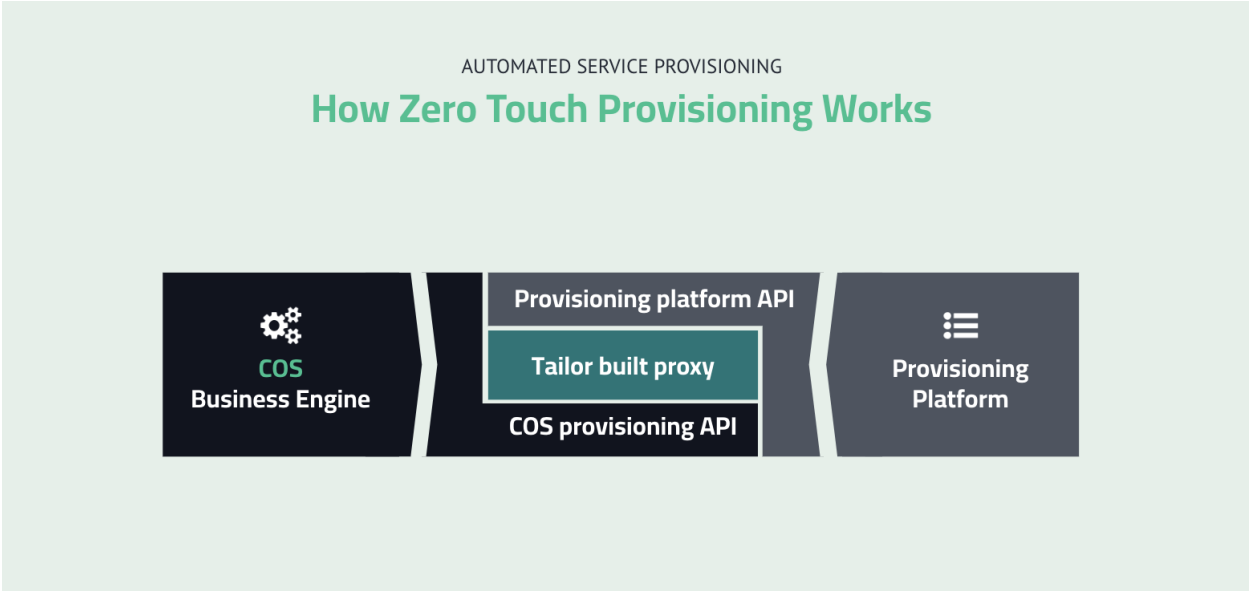
same time, eg. Internet from one ISP and IP Phone (VOIP) from another. And these services are automatically activated on the network regardless of which ONT/CPE brand you choose - our API integrations can support any brand.



In the marketplace service providers can market additional services (such as television, telephone, medical smart home, VOD etc) to the broadband service as they wish and can configure this in their own portal without involvement of the operator.

4.3 Zero Touch Provisioning

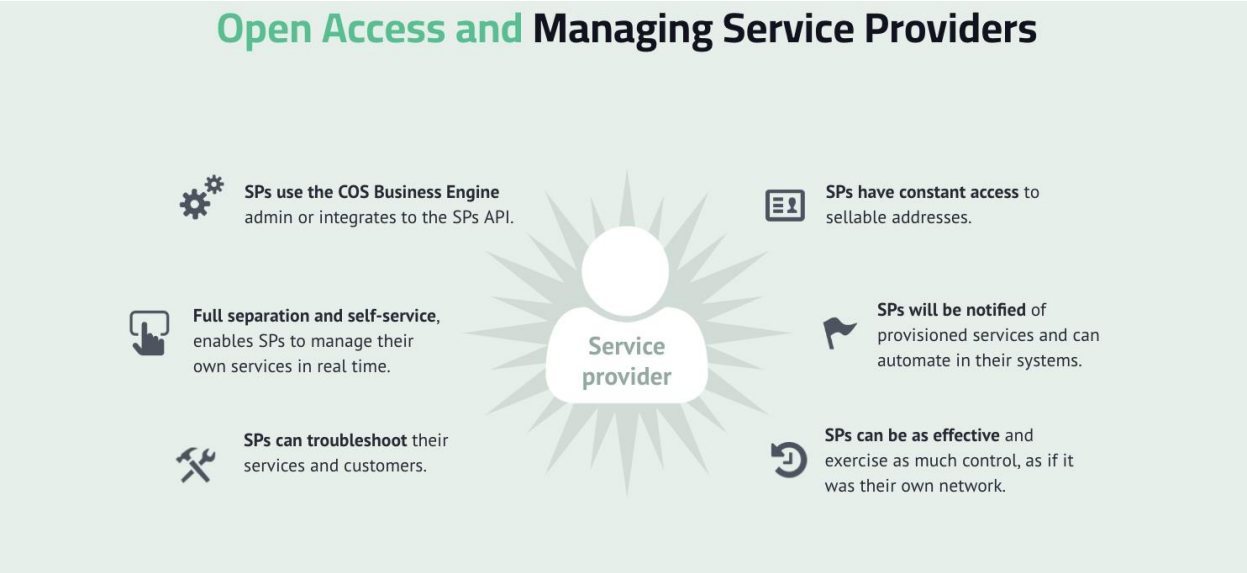
The COS software is integrated with the network equipment management system to perform the activation/deactivation of the service, and much more.



The subscriber will be able to go to the Marketplace and search for their address. This will show them available services for their address. As they make their selection and complete the signup steps, COS Business Engine will send provisioning instructions to the electronic vendor's NMS (Network Management System) platform. Within 1 minute the service will be provisioned. Most often they do, but service orders must not be placed on the Marketplace. If the Service Provider is in contact with the customer, they can place the order directly in the COS Business Engine which will trigger automated service provisioning. There is also an API for Service Providers if they would like to be able to do this on their own website or from their own CRM/BSS system.

4.4 Service Provider Management

The Service Providers will have access to manage their service offerings and pricing and also to troubleshoot customers experiencing problems, and resolving tickets, as well as establishing trouble tickets with the Operator.



Business Engine is a seamless system for open access operators and ISPs and provides Access for Service providers to diagnostic data for troubleshooting. As a provider is selling services to a customer, they will be able to access diagnostic data for how their service is performing at the customer location. This data is extracted from the NMS platform through the API integration. The Service Provider will be able to troubleshoot their customers almost as if it was their own network, but only for their subscribers thanks to the COS Business Engine service provider separation.

4.5 Data Integrity

Business Engine has over 2000 data validations built in to ensure long-term data quality. Some validations are done on input or import, while some are done continuously to detect discrepancies and highlighted in the Provisioning dashboard for administrators to take action. This way revenue leakage is eliminated.

4.6 Software Ecosystem

No one likes to swivel chairs between systems, which is not only inefficient, but also the main reason for poor data quality. That's why the COS platform offers multiple options for integrations, data transfer and validations. COS believes in data quality and control in order to manage an efficient profit generating network. We have developed Business Engine as a Central Dashboard for your software ecosystem. We integrate with a variety of tools including fiber network planning and documentation, construction management and hardware partners to make our customers networks as unique as each customer.

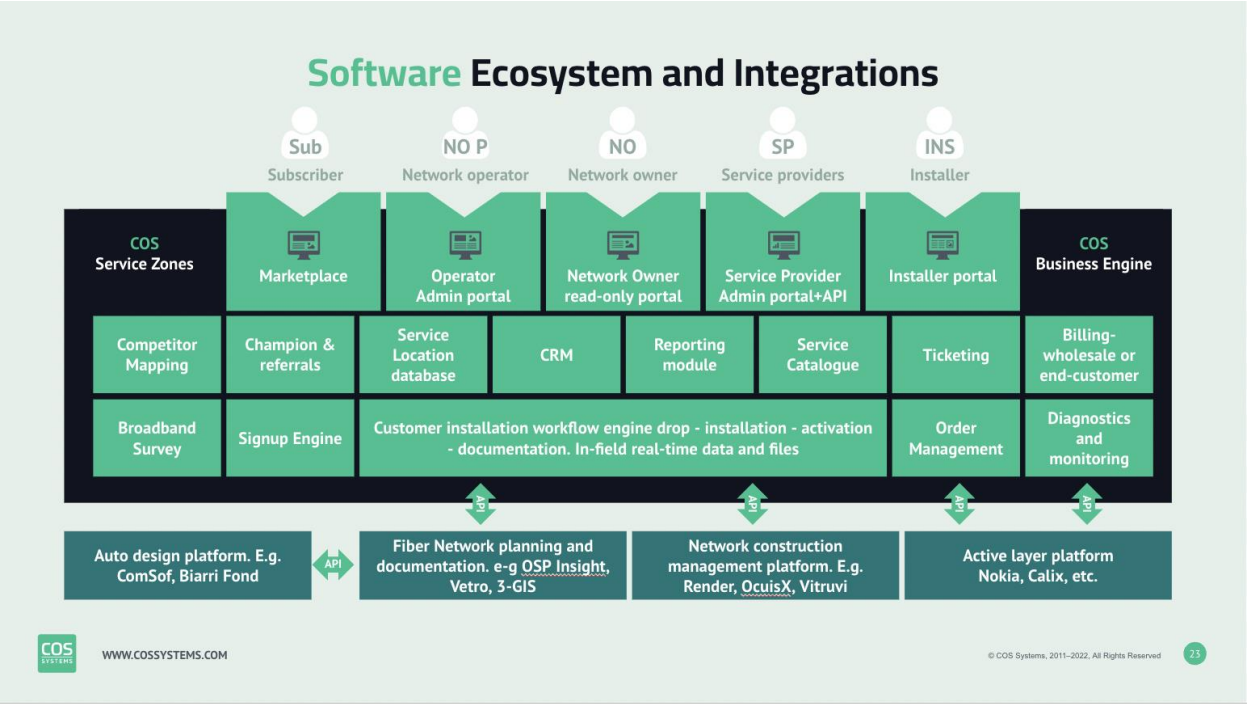


Figure 9: COS software ecosystem

4.7 Network Architecture and Hardware Flexibility

Successful network deployments typically revolve around well-established network protocols, selecting vendors based on individual requirements aligned with those protocols. This ensures modularity, growth capability, and easy maintenance. Currently, other all in one open access hardware/software solutions appear as a proprietary "black box" system, which might make future diversification challenging without a total overhaul. COS believes that software and network hardware should be independent allowing customers to make a best-in-class decision on each.

We support flexibility in network architecture and vendors, supporting both Active Ethernet and PON networks. We believe that it is a customer by customer decision to choose architecture and supplier. Many networks over time will evolve and support multiple vendors.

5 References and Contact Information

5.1.1 Corporate Information

COS Systems is located at 42 Broadway, Suite 12-206 New York, NY, 1000. The contact for the City of Superior is COS CEO Mikael Philipsson Mikael.Philipsson@cossystems.com, 800-562-1730.

5.1.2 Company History and Formation

COS Systems was incorporated in Umea Sweden in 2008 and has been in operations as a software company serving FTTH operators and open access operators since its inception. Since 2013, COS Systems Inc has been an American wholly owned subsidiary of the company group COS Systems AB, which is based in Sweden. The operations in the USA are run through COS Systems Inc.

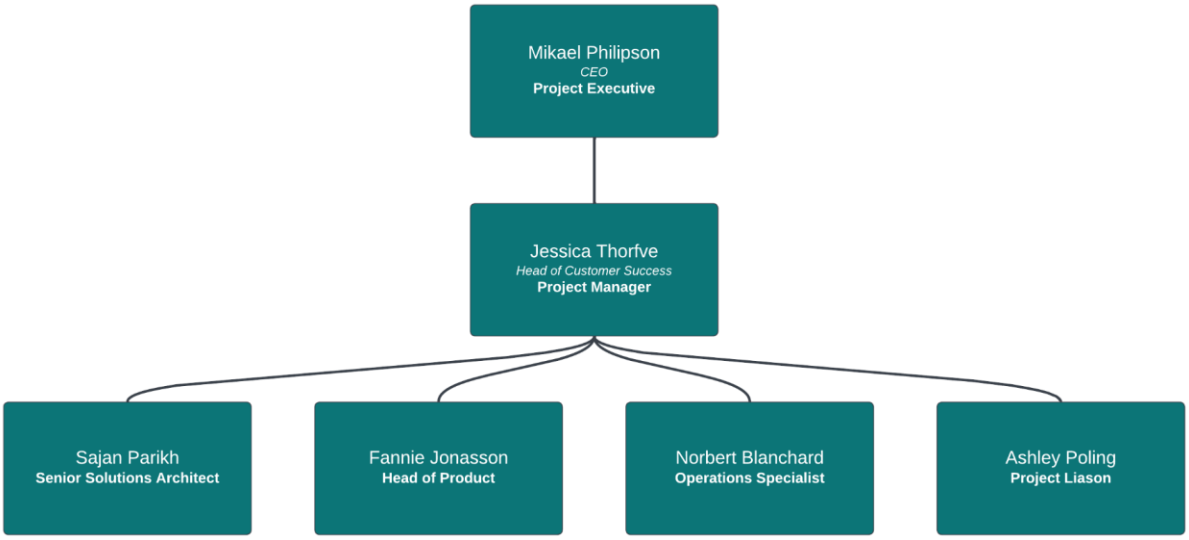
COS Systems is privately owned by COS Systems AB. COS Systems AB is in turn owned by Private Equity fund Pivot Partners AB.

5.1.3 Number of Employees

COS Systems employs 30 employees.

5.1.4 Organizational Chart

COS systems implementation team has the largest combined experience implementing and supporting open access projects of any company in North America. Led by our CEO Mikael Philipsson who ran IP Only - a Nordic Open Access operator that brought FTTH to over 1 million passings. Our team will support the onboarding of the City of Superior's Business Engine instance and all integrations and best practices for a best in class automated open access network.



Implementation Team:

Mikael Phillipsson - CEO/ Project Executive

Mikael has over 20 years of experience in building and operating fiber infrastructures and 18 years with IP-Only, a nordic fiber wholesale and large enterprise operator where he held roles as CEO (7 years), CTO, Sales Director, Product & strategic sales. He led the restructuring from a pure B2B Fiber infrastructure operator to enter the residential FTTH market with an open access business model. 1.5 million addressed households and 1m HP built in close partnerships with 100+ municipalities. 25+ acquisitions and 2 public take-outs (DGC and Availio). Revenue growth from 47m Euro, 145 FTE in 2013 to 200m Euro and ~700 FTE in 2018.

After leaving IP-Only, several projects as Industrial advisor to EQT in the fiber/Internet Security sector and since 2020 engaged in COS Systems, first in the board and since February 2021 as CEO.

Jessica Thorfve - Customer Success Director

Jessica started her career in 2011 working at T3 (telecom 3 Sverige AB), a nationwide Service Provider operating in over 160 open access fiber networks throughout Sweden. She has always worked closely with the open access Network Operators and has deep insights from a Service Provider perspective on the operational procedures in FTTH networks. Since she started at COS, she has been working as a Customer Success Manager

onboarding customers on the COS platforms and being responsible for project management in implementation projects of COS Business Engine across North America.

Sajan Parikh - Senior Solutions Architect

Sajan possesses over a decade of distinguished experience in the telecommunications sector, having served in roles ranging from engineer to executive and consultant. He has notably impacted over 700 global networks, infusing each project with a distinctive perspective that harmonizes operations, technology, and leadership. Key achievements include spearheading the launch of both wireless and wireline Internet Service Providers (ISPs), overseeing large-scale mergers and acquisitions from both business and technical standpoints, and devising network designs and migration strategies for Fortune 100 enterprises. Additionally, Sajan is adept as a software engineer and network architect, having meticulously constructed and integrated technology ecosystems to ensure alignment across diverse business units, including sales, support, network design, operations, field teams, management and executive leadership.

Norbert Blanchard - Operations Specialist

Norbert was born and raised in France and has been living in the US for 22 years and is a current resident of San Francisco, California. Norbert has worldwide experience in the telecom and IT industries, working for global equipment suppliers and operators in large corporations and start-ups in consulting, sales and operations, and has managed relationships with government representatives, enterprises, and strategic partners. Norbert shares the COS passion for open access and has worked as an Operations Director for Covage, one of the largest open access networks in the world, with operations in France and Spain.

Ashley Poling - Senior Sales Executive - Project Liaison

Ashley has been working in the Fiber to the Home industry for nearly a decade. Prior to coming to COS, she led projects with municipalities, electric utilities and cooperatives across the US from feasibility through network launch and marketing with the turnkey firm Magellan Advisors. She joined the COS team in 2022 to support the rapid expansion in North America and ensure fiber operators have the best tools to enable accessible FTTH to everyone, everywhere.

5.2 Implementation Experience

The following examples are implementations the COS team has completed in North America that highlight their overall ability to produce automated open access networks for our customers:

Pictou County, Ontario Canada

Pictou County has worked with provincial funding to deploy an open access network to its residents who struggle with low speed or total lack of access. The County's network is open access and currently has three internet service providers. The County chose in 2022 to implement COS Business Engine to power the County's project. It's a GPON network and the electronics are provided by COS Partner Ciena/Tibit. Customer facing Marketplace: marketplace.munpict.ca

Kitsap Public Utilities - Poulsbo, Washington

Kitsap PUD is a public utility in the USA that was COS's first open access customer in North America. The cooperation started in 2016 with the implementation of COS Service Zones to aggregate demand for FTTH in Kitsap County, with some 100 000+ households. Later COS Business Engine was selected as the operations platform for the open access network, where five providers are competing for the growing number of customers. It's an Active Ethernet network, and the electronics are from Allied Telesis.

https://ftth.socious.com/blog/kitsap-pud-signs-agreement-to-manage-open-access-network-with-cos-business-engine

City of Rexburg, Idaho

The City of Rexburg, Idaho has established the need for digital infrastructure and began investing in a backbone for municipal services and to propel fiber to the home in an open access business model. In 2023, the City created an agreement with Silver Star Communications to invest in and run the public private partnership network called LightBridge. The City's network utilizes COS Business Engine as the software to allow automated open access and multiple service providers (currently three). It's a multi-gig PON network and the electronics are provided by Calix. COS is a global elite partner and the preferred open Access partner of Calix. Customer facing Marketplace: lightbridge.com. Silver Star is also building open Access FTTH in Jackson, WY, operating it with the same instance of COS Business Engine. See, silverlight-fiber.com

Red Deer County, Alberta, Canada

Red Deer County in rural Alberta, Canada has joined forces with neighboring municipalities and the electric cooperative to create a municipally controlled corporation called Rural Connect Ltd. to deliver broadband Internet services to thousands of rural residents under-served by existing private sector service providers. Rural Connect will build an open access network operated by COS' partner Valo Networks. Valo will bring its experience running Open Networks to the consortium and utilize COS Business Engine to promote an automated open access network with a marketplace for multiple providers. The provider of GPON hardware is Fiberhome.

Southern Ute Tribe - Ignacio, Colorado

The Southern Ute Indian Tribe will deploy an open access Fiber to the Home network to connect almost 3000 residents in its territory. The partnership with operator Bonfire Fiber will utilize COS' Business Engine to manage and operate the open access network, allowing ISPs to sell services over the network. The provider of GPON electronics is Nokia, with whom COS has a global partnership with a multitude of implementations in North America and Europe. The COS Business Engine Marketplace is not open to the public yet as construction is still underway, but the demand aggregation platform is open for survey takers and pre-signups: bonfirefiber.servicezones.net.

5.3 References and Clients

Kitsap PUD - Kitsap, WA

Contact: Angela Bennik

Address: 1431 NW Finn Hill Rd, Poulsbo, WA 98370

Phone: 360-271-3425

Date Work Performed: 2016 - Current

Description of Work:

Kitsap PUD is a public utility in the USA that was COS's first open access customer in North America. The cooperation started in 2015 with the implementation of COS Service Zones to aggregate demand for FTTH in Kitsap County, with some 100 000+ households. The year after COS Business Engine was selected as the operations platform for the open access network, where five providers are competing for the growing number of customers. See kpud.broadbandportal.net

Silver Star Communications - Freedom, WY

Contact: Brock Walters

Address: 3700 E 41st Ave, Denver, CO 80216

email: bwalters@silverstar.net

Date Work Performed: June 2023 - Current

Description of Work:

Silver Star Networks is a 100+ year old telecommunications company that began delivering phone services in 1912 in the area of Star Valley Wyoming, they began building Fiber in the 1990's and have expanded to include over 1800 miles of fiber delivering services to businesses and residents. In 2023 Silver Star began deploying Fiber to the Home in two communities utilizing an open access model. They have chosen COS Systems Business Engine to power their open access business in both Jackson, Wyoming and in partnership with the City of Rexburg, Idaho. See lightbridgefiber.com and silverlight-fiber.com (these are actually just two separately branded Marketplace operated by one COS Business Engine instance)

WideOpen Networks - Blacksburg VA

Contact: Dr. Andrew Cohill

Address: 2000 Kraft Dr SW #2150, Blacksburg, VA 24060

Phone: 540-552-2150

Date Work Performed: 2019 - Current

Description of Work:

Dr. Andrew Cohill, who is the founder of WideOpen Networks, was the director of Blacksburg Electronic Village, a very early internet community built around the University of Virginia Tech. After working with a large number of communities across the USA to plan, design, build and operate fiber networks, COS Service Zones and COS Business Engine were selected as the key platforms as they set out to build an open access Network in Blacksburg and surrounding counties in 2019. See wideopen.servicezones.net and wideopenblacksburg.broadbandportal.net

Bonfire Fiber - Denver, CO

Contact: Justin Roller

Address: 3700 E 41st Ave, Denver, CO 80216

email: Justin.Roller@bonfireig.com

Date Work Performed: 2022 - Current

Description of Work:

Bonfire Fiber is an open access Fiber network owner and operator in the Mountain Region of the US working closely with municipalities to meet the needs of bridging the digital divide. Bonfire chose the COS platforms Service Zones and Business Engine in 2022. The team has worked alongside our customer success team to implement and launch the products in their first market operating an open network for the Southern Ute Tribe. See bonfirefiber.servicezones.net

Below is a partial list of clients that COS Systems delivers similar services to Connect Superior 's goals. COS has also served 100+ current and past customers on our demand aggregation product, Service Zones over the past 10 years including municipalities and municipal utilities.

Client	Contact	Number	Address	Email
Fujitsu Network Communications	Anthony Bednarczyk	214-784-8333	2801 Telecom Parkway, Richardson, Texas 75082	Anthony.Bednarczyk@fujitsu.com
NoaNet	Clair Ward	816-519-2370	11707 E Sprague Ave. Suite 201 Spokane Valley, WA 99206	claire.ward@noanet.net
Valo Networks	Phil Roberts	403-830-9235	09 8 Ave SW #200, Calgary, AB T2P 1B8, Canada	phil.roberts@valonetworks.com

IBI/Arcadis	Keith Ponton	780-982-0192	537 South Broadway Suite 500 Los Angeles CA 90013 United States	keith.ponton@ibigroup.com
Municipality of Pictou County, ON, Canada	Derek Eisan	902-485-4311	46 Municipal Drive, Pictou Nova Scotia, Canada	derek.eisan@ruralmopc.net
Rock Networks, Canada	Joe Hickey	613-853-7858	89 Cutler Ave. Unit 104 Dartmouth, Nova Scotia, Canada, B3B 0J5	joe.hickey@rocknetworks.com
Regio Help, Austria	Willem Brinkert	+43 650-94-55-362	Gewerbegebiet Nord 9, Munderfing, 5222, Austria	willem.brinkert@regiohelp.eu
Telia Company, Europe	Chris Chemnitz Head of Activation Common | CPS IT Production	+46 73 064 50 89	Stjärntorget 1, 169 79 Solna, Sweden	Chris.chemnitz@teliacompany.com
FiberNet, Finland	Janne Ahola, Managing Director	+35 850-37-76-505	Vanha Kaarelantie 33A, FI-01610, Vantaa, Finland	janne.ahola@fibernet.fi
VX Fiber, Europe, Africa	Jens Sörensen Chief Deployment Officer	+46 708431070	Ostra Radhusgatan 6, 903 26 Umea, Sweden	jens.sorensen@vx.se
BostNet, Sweden	Jessica Hakansson	+46 70-540-7570	Ostra Kyrkogatan 2, 901 06 Umea,	jessica.hakansson@bostaden.umea.se

			Sweden	
Ume.net, Sweden	Lena Solstam	+46 70-209-4407	Storgatan 34, 901 05 Umea, Sweden	lena.solstam@umeaenergi.se
Skellefteå Kraft, Sweden	Anders Pettersson	+46 910-740-693	Kanalgatan 71, 931 34 Skelleftea, Sweden	anders.v.pettersson@skekraft.se

6 Solution Specifications – Software:

Support for syslog, SNMP, trap and performance management in OSS software

COS supports ingesting events from various sources and acting upon them. For example, COS can ingest SNMP Traps from NMS systems when a new ONT is first seen, triggering an action to create and add that ONT into COS's inventory for later provisioning to a customer.

Another example would be ingesting a message from an NMS that involves an alarm or fault.

The exact nature of COS's involvement in these types of monitoring protocols varies depending on the organization and other vendors selected.

Our suggestion would be to properly align your monitoring needs to the different organizational units, their personnel, first-party EMS systems, and the protocols they support. This is a typical process during onboarding and cannot be answered until other dependencies are carefully agreed upon.

Layer 2 segmentation technology provide separate VLANs/VPNs for each ISP and its customers on the open-access network

COS Business Engine maintains and manages the business and commercial offerings across different geographic areas, service location types, different ISPs, and complex pricing and technical items that come from any and all permutations of a particular customer choosing a particular service from a particular ISP.

COS takes this information and automatically provisions to a variety of vendors and creates Layer 2 separation and handoff between not only the ISP, but potentially service type, or package through the use of 802.1Q VLANs, S-Tags, and C-Tags.

COS can be configured to support different business models, the most common being the VLAN on the data port of the ONT being the tag assigned to the ISP, the S-Tag corresponding to hardware or PON attributes, and the C tag being unique to each customer in that region or area.

This is one of many potential ways COS Business Engine can create different types of Layer 2 separation not just between the ISPs but also other potential items.

24x7x365 next-business day hardware and software maintenance on critical components

COS provides a tier-based SLA based on the critical nature of a potential error. For critical errors the SLA supports a four-hour reaction time.

Provisioning for all subscriber services, including residential single-family, multi-family, commercial and community anchor

COS Business Engine supports the provisioning of all subscriber types and alternative services beyond just Internet.

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