STRATEGY ANALYTICS
Celebrating 25 Years of Insights

Networks and Service Platforms

amdocs

Two Revenue Generating Use Cases Leverage New Network and Service Orchestration: I. Managed SD-WANs, II Multi-Domain, Multi-Cloud Network Slicing

03 January 2022

Report Snapshot

Next generation networks and 5G are all about services delivered with high reliability, scalability and guaranteed performance across any network using End to End Network and Service Orchestration (E2ENSO).
This document describes two E2ENSO Use Cases that create CSP revenue opportunities in 2022 for:
I. Managed Secure SD-WANs
II. Multi-Domain, Multi-Cloud Network Slicing.

Contents

Executive Summary

Network and Service Orchestration are becoming Complex with Multiple Domains and Clouds

Next generation networks and 5G are all about services. To deliver these services End to End (E2E) Network and Service Orchestration (NSO) or E2ENSO is evolving. As the services and their underlying networks become increasingly complex to operate and manage E2ENSO plays a critical strategic role in the delivery and scaling of resources - with Life Cycle Management (LCM), service onboarding, instantiation, execution, management and E2E assurance.

Over the next two years edge services and increasingly disaggregated 5G network and service functions (VNFs, CNFs, NFs and SFs) will further complicate service delivery as their distributed processes explode across multiple telecoms and cloud domains - from the RAN to the edge or from the edge server to the hyperscaler data center. Almost every service will soon need to operate across multiple domains and technologies, traversing from fixed or mobile access to the edge and the core, across the telco cloud or between multiple CSP, private and hyperscaler clouds.

So how can Communications Service Providers (CSPs) handle such a massive increase in complexity without loss of performance or increase in E2E latency across this diverse Multi-Domain, Multi-Cloud environment?

E2ENSO Addresses the Challenge

E2ENSO is no longer simply 'management overhead' but is now a critical real time necessity for revenue generating services. By implementing a truly holistic E2ENSO operators can finally capture a higher return on their investment in new network infrastructure and cloud native software platforms. E2ENSO helps to translate their investment in software functionality and real time network resource control into service value through greater business agility, multi-vendor choice, faster time to market for service features, lower operating costs and improved E2E customer satisfaction.

Two Use Cases Demonstrate E2ENSO value

In this extract from the published White Paper **'End-to-End Network and Service Orchestration (E2ENSO) Challenges demand New Approaches'** we describe two use cases that demonstrate how E2ENSO will help grow CSP revenues over the next decade. Specifically, they are:

- *Use Case I. Managed Secure SD-WAN services*
- *Use Case II. Multi-Domain, Multi-Cloud Network Slicing*

In the first Use Case we show how E2ENSO can dramatically simplify the operational complexities of today's managed Enterprise SD-WAN service.

In Use Case II we briefly describe how E2ENSO makes it feasible to create and manage E2E Network Slices that operate seamlessly across multi-access, multi-vendor, multi-service provider domains under current 3GPP standards. The solution indicates how CSPs can offer Network Slicing as a Service (NSaaS) hosted in a hyperscaler cloud, operating across hybrid private and public cloud domains.

CSPs Benefit Immediately from E2ENSO

E2ENSO allows CSPs to immediately deliver new scalable, high reliability services to enterprises, small business users and consumers that meet all the performance, privacy and security requirements of both 5G wireless and legacy fixed broadband networks seamlessly, transparently and at lower cost.

Use Cases Demonstrate Value of E2E Network and Service Orchestration (E2ENSO)

To show the value of E2ENSO, below we examine two generic types of use cases that are critical for the growth of Communications Service Provider (CSP) revenues over the next decade. Specifically, they are:

- ***Use case I. Managed Secure SD-WAN services***
- ***Use case II. Multi-Domain, Multi-Cloud Network Slicing***

Use Case I. Managed Secure Enterprise SD-WAN

Problem

As more enterprises and SMEs have shifted their applications and workloads to cloud environments, traditional MPLS-based WAN architectures have become inefficient and hard to manage. This has motivated organizations to adopt managed SD-WAN services from CSPs. CSPs have responded by rapidly increasing the variety of SD-WAN vendor solutions they deploy in their networks to grow their customer base and meet the diverse requirements of different businesses. To differentiate their offerings from competitors and increase their value proposition most CSPs have enhanced their managed SD-WAN with security and value added service (VAS) bundles that utilize a wide range of 'best-of-breed' vendor solutions.

At a 2021 'SD-WAN Symposium' Orange Business Services outlined key reasons that customers turn to CSPs for managed SD-WAN service.[5] These typically center on requirements that a single SD-WAN vendor finds hard to meet, including:

- Quality assurance of Virtualized SD-WAN when physical link monitoring is no longer meaningful.
- Flexible Hybrid Public Private Networks
- Hybrid Access for Multi-Cloud and Private Networks
- Options for 'co-managed' or fully managed SD-WAN
- Flexible choice of multiple SD-WAN vendors including Cisco (Viptela), Citrix, Fortinet, Palo Alto, Juniper, Nokia (Nuage), Oracle (Talari), HPE Aruba (Silver Peak) and VMware (Velocloud) etc.
- Multi-SD-WAN networks i.e. segments of SD-WANs from different vendors that may use different access transport networks with 'local breakout' etc. *Note These often result from mergers or company restructuring.*
- Security – especially at the Edge with and without Integrated ***Secure Access Service Edge (SASE)***

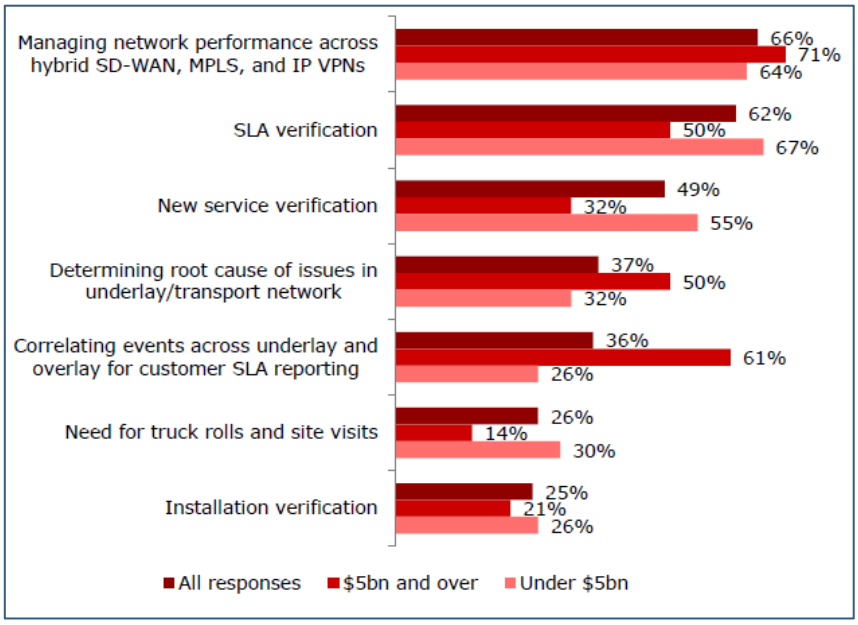
A common hurdle to offering managed SD-WAN service is that most CSPs' current service operations platforms do not allow a seamless upgrade path beyond traditional connectivity services. CSPs and their enterprise customers have often been forced to rely upon manual processes for provisioning and managing SD-WAN and virtualized network services. This significantly impedes CSPs' ability to quickly spin up, manage and scale service upgrades. For CSP operations personnel correlating SD-WAN network underlay and service overlay events while managing full end-to-end service performance across multiple systems has been a major challenge.

Therefore despite the opportunity for revenue growth, the task of building and delivering SD-WAN offerings presents **new and unique challenges** for CSPs whether for **onboarding and integrating new**

vendor and partner solutions, creating new offerings, or delivering, managing and monetizing these services.

A 2020 survey of operators prioritized some of the biggest CSP challenges in the delivery of '***SD-WAN as a managed service'*** are summarized in the chart below

Chart 1. SD-WAN – Biggest Challenges for delivering *SD-WAN as a Managed Service*



Source: Heavy Reading Survey 'The Future Managed SD-WAN Services'[6] *December 2020*

These survey results indicate that CSPs must leverage the visibility and functional capabilities of E2E network and service orchestration (E2ENSO) to overcome these operational challenges and accelerate service automation that is able efficiently to manage hybrid SD-WAN networks that span multiple domains including:

- Physical and virtualized cloud SD-WAN functions
- SD-WAN deployment within the CSP network, the Hyperscaler cloud or on the enterprise premises.

Solution

E2ENSO now offers an approach that can dramatically simplify CSPs managed SD-WAN operational complexities based on:

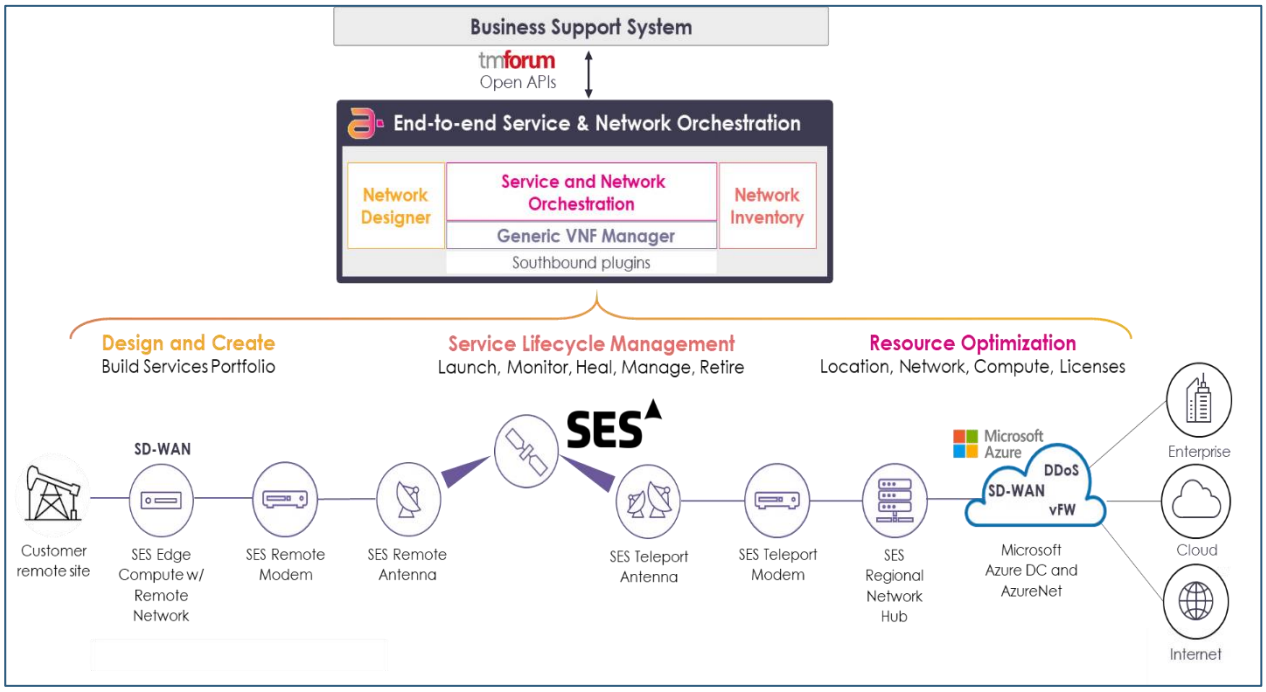
- **Hybrid SD-WAN, security and MPLS connectivity** handled with a single Multi-Domain Orchestration solution
- **Service Level Agreement (SLA) parameters** met with E2E Service Assurance and QoS
- **Automated service verification** established via catalog integration and request validation
- **Root cause and underlying event correlation** performed with integrated network monitoring and Automated Machine Learning (ML)
- **SD-WAN CPE/appliance installations and verification** replaced with remotely upgradeable firmware and uCPE
- **Installation verification** performed with automated remote monitoring.

Use Case I – SES Example

SES Satellites' implementation of an E2E Network and Service Orchestration solution from Amdocs demonstrates the growing need for end-to-end service orchestration with integrated digital service lifecycle management for a ***new generation of video and network SD-WAN services that span many domains***, including physical, virtual and cloud network functions, across satellite access, radio access, fiber transport and core infrastructure [7].

The solution – shown in the chart below -enables SES to manage increased scale and complexity by automating existing service and network operations, while at the same time increasing its capacity to accelerate the launch and delivery of innovative services for broadcasters, content owners, mobile operators, enterprises and vertical industry segments.

Chart 2. Using a single multi-domain E2ENSO to Orchestrate Managed Secure SD-WAN and other L2/L3 connectivity services over a hybrid network



Source: Updated form Layer123 World Congress 2021: 'Orchestrating 5G from Space' [8] November 2021

Growth of CSP managed SD-WAN has accelerated dramatically during the COVID-19 pandemic and this combination of satellite, cloud, and terrestrial infrastructures has allowed SES to stay at the forefront of uninterrupted SD-WAN service delivery, by enabling increased distribution of data and empowering millions of individuals to work from home.

Use Case II. Multi-Domain, Multi-Cloud Network Slicing

The Promise of Network Slicing to enable the creation of secure, private logical E2E networks – *each with distinct Quality of Service (QoS), Security etc. operating over a common shared physical network* **– has been delayed by lack of management and orchestration. E2ENSO fills the gap and makes 'Network Sliding as a Service' feasible in 2022.**

In principle Network Slicing offers the *benefits of a dedicated private network with the economics of a shared public network*. Network Slicing has long been touted as a major revenue generator for Communications Service providers (CSPs) but has remained very hard to implement and operate over legacy *LTE systems that lack advanced E2E Slice network and service management capabilities.* As a result Network Slicing revenues have hitherto, largely failed to materialize.

Problem

Despite the evolution to 5G Standalone (SA), many 4G and 5G Non-Standalone (NSA) LTE networks will continue to operate and grow for many years. 4G service platforms will continue to deliver many 'basic' services such as RCS messaging, Voice over LTE (VoLTE), Unified Communications and IMS multi-media services as well as basic data i.e. User Plane Function (UPF) connectivity that can be upgraded with new 4G Release 15 features to interwork with a pure 5G SA core. **As they wait for ubiquitous 5G SA, CSPs urgently need a multi-domain network slicing approach that can deliver E2E Enterprise voice and data services for both Public 4G NSA and Private 5G SA Enterprise domains.** But without E2ENSO capabilities to manage and orchestrate these E2E Enterprise 4G NSA and 5G SA services seamlessly the hybrid network rapidly becomes an 'operations nightmare' of incompatible domain specific management and monitoring systems.

Solution: Multi-Domain Multi-Cloud Network Slice (NS) Management

The solution is to deploy an E2E Network Slice (NS) across the multiple technology and other domains, stretching from end users in the RAN to the edge servers or over alternate transport options to the core service platforms - some of which may even belong to different administrative domains.

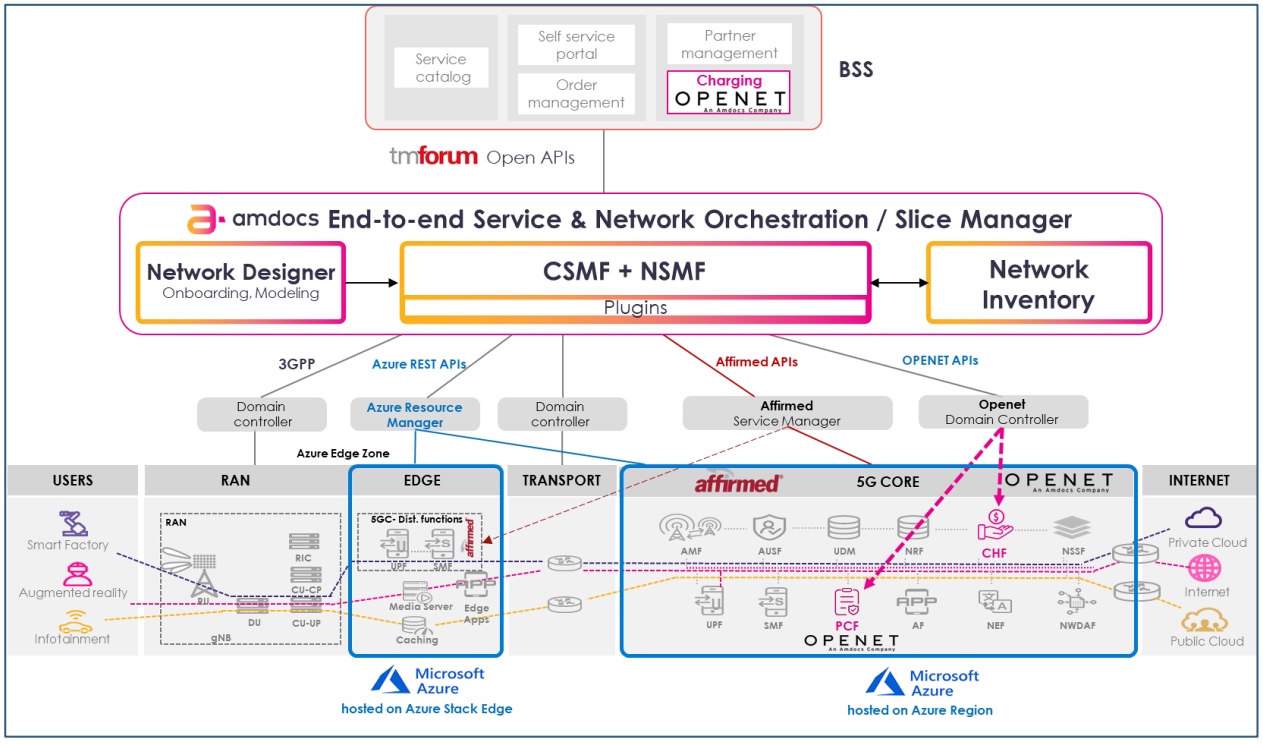
The process of establishing such multi-domain Network Slice Instances (NSIs) demands a *hierarchical network abstraction* that allows generic 'consistent' lower layer resource allocation and management. To achieve this, when a slice request is received several tasks must occur including:

- *Mapping of the service requirements onto capability requirements.*
- *Translating the capability requirements into:*
  - NSI resource requirements for compute, storage and networking resources.
  - NSI topology and connectivity type, policy, isolation and security requirements.
- *Identifying the infrastructure-domains with the required resources, that can assure the E2E NSI functional and operational requirements.*
- *Creating the federated NSI.*
- *Providing run-time coordination management operations across different domains for maintaining the end-to-end NSI service integrity.*

Use Case II – MS Azure Example

In the example shown in the chart below, the 5G Core service platform network functions are hosted for efficiency and scalability in both the MS Azure Regional Cloud and at the MS Azure Edge. The platform is able to offer services to a private 5G wireless network e.g. for a Smart Factory (shown on the left below); or for Augmented Reality (SR) and Infotainment as part of a complete hosted Microsoft Azure and Azure for Operators (AFO) capability. The solution operates seamlessly across multiple domains - Users, RAN, Edge, Transport, Core, Internet and Multiple Public Clouds to **allow CSPs to offer a dedicated Network Slice as a Service (NSaaS) to MVNOs, Platform as a Service (PaaS) to large Enterprise users and Software as a Service (SaaS) to small and medium enterprises (SMEs)** at a far lower price than a dedicated network and on premise solution. As announced on May 24th.2021[9], this multi-domain E2ENSO (based on the Amdocs Intelligent Networking suite) integrates with Azure and **enables service providers to deploy and orchestrate 5G network functions on the Azure cloud.**

Chart 3. Using a single Multi-Domain E2ENSO to Orchestrate 5G services over Telco RAN/Cloud, Transport and Public Cloud/Edge



Source: Updated from Light Reading '5G Orchestration & Service Assurance Digital Symposium' [10] *June 2021*

End-to-End Slice management, using E2ENSO, therefore not only enables service providers to offer their enterprise customers ***Secure Private Edge Solutions*** that combine seamlessly with *hosted solutions for cost savings and scalability* but allows them to operate ***Service Platforms*** **seamlessly across metro area and regional networks** and to offer ***'Network Slicing as a Service'*** without waiting for future 3GPP releases.

Multi-Domain Telco and Hyperscaler Cloud Benefits

Private LTE and 5G networks that demand multi-domain management for multi-domain access are already a reality. Now with 3GPP Release 16 for 5G SA, the management and orchestration details of Network Slicing services have been specified as well as the **mechanisms to allow Network Slices to *operate seamlessly across multiple domains.*** As CSPs deploy Release 16 in late 2021 and 2022 they can finally offer seamless delivery with guaranteed QoS and SLAs for services running over Network Slices across multiple domains – even including LTE Release 15 service VNFs - and Cloud Hosted platforms with CNFs or SFs.

Today E2ENSO enables CSPs immediately to leverage their strengths to deliver scalable, trusted, high reliability Network Slicing to large enterprises and small business users alike, while meeting all the QoS, security and privacy requirements for campus, metro area edge or cloud data center environments.

'Sweet spot' for CSP Orchestrated Network Slicing is emerging.

Enterprise networks inherently demand Multi-Domain, Multi-Access (Fixed, WiFi and Wireless) and Multi-Cloud Interworking. This combination potentially represents 'the sweet spot' for CSP Network Slicing services since it leverages CSPs' role as a secure, trusted, highly reliable neutral intermediary that both provides flexible, secure, guaranteed connectivity and offers E2E Services hosted not only by CSPs, but by the Cloud Hyperscalers or even Enterprises themselves.

Implications

To address these Use Cases and meet the new network challenges of hybrid multi-domain, multi-vendor networking operators need new tools, processes and automation that focus on E2E Network and Service Orchestration (E2ENSO). Amdocs solutions can deliver:

- *Multi-Domain orchestration*
- *Abstraction of diverse vendor inputs for seamless automatable functionality*
- *Full Lifecycle Service Management and Orchestration*
- *Multi-Vendor and Vendor Agnostic solutions*
- *Integrated Network and Resource Management and Orchestration with:*
  - *Lower Layer Real Time Monitoring for closed loop pro-active service protection and assurance*
  - *Intelligent Network Function Placement for Optimal Performance*
  - *Automated Abstraction of Service Functions for seamless service interoperability*
- *Open APIs and open standards based solutions integrated to create a modular flexible solution for easy customization and 3rd. party extensibility and interoperability*
- *Modular, cloud native, microservices-based architecture for IT-like deployment on private and public clouds*

References

1. 5G-PPP '5G PPP Architecture Working Group, View on 5G Architecture, Version 3.0 February 2020
2. TM Forum Webinar 'NOC transformation with cognitive automation: a Vodafone case study' Mark Newman Chief Analyst, May 2021
3. ETSI ZSM (Zero-touch Service Management) ETSI ZSM Portal
4. ETSI WP N32 'Network Transformation (Orch. Service and Network Mgt. Framework)' October 2019
5. Light Reading 'SD-WAN Into the Multi-Cloud Digital Symposium' May 2021
6. Heavy Reading Survey 'The Future Managed SD-WAN Services' December 2020
7. AMDOCS Press Release 'SES to Deploy Amdocs End-to-end Service Orchestration Capabilities' Aug. 2020
8. Layer123 World Congress 2021: 'Orchestrating 5G from Space' November 2021
9. AMDOCS Press Release 'Amdocs Expands Strategic Collaboration with Microsoft to Boost Service Providers' Journey to the Cloud' May 2021
10. Light Reading '5G Orchestration & Service Assurance Digital Symposium' June 2021
11. AMDOCS Solution Brief 'NFV SD-WAN package on Azure' 2019
12. Intel Network Builders 'Amdocs Offers Network Function Placement in 5G Slice Manager' March 2021

Additional References

13. Amdocs Solution Overview 'End to End Service and Network Orchestration' May 2021
14. *ETSI Webinar* 'Introduction of key standardization aspects of E2E Network Slicing (ZSM003)' Sept. 2020
15. Strategy Analytics 'Management, Orchestration & Automation not just Overhead anymore' Nov. 2019
16. Strategy Analytics '5G Network Slicing - Management and Orchestration Aspects' Nov. 2019
17. Strategy Analytics 'Multi-Domain Orchestration makes 5G Network Slicing Real for Non-Public Networking (NPN) in 2021' January 2021

Analyst Contact

The author of this Report: Sue Rudd, Director Networks and Service Platforms at Strategy Analytics can be reached at srudd@strategyanalytics.com,

Get help from Strategy Analytics

Working with Strategy Analytics gives you the knowledge you need to succeed.

Understand your customer

Business opportunities abound. But which ones are right for you and your customers? Which will give you the advantage?

Optimize your user experience

Optimize your product to give your users the best experience and you the market advantage.

Analyze the market

Understand the size of the opportunity and where your product fits using our unrivalled knowledge and world class data analysis techniques.

Explore your future

Working with us will focus you. With our insight and forecasting expertise you'll make confident strategic decisions that drive success.

Please contact us at **custom@strategyanalytics.com** with any questions and for further details and solutions on how we can work with you on creating a custom solution to address your specific needs.