

## MAJOR CPG COMPANY MIGRATION TO AZURE IN 24 HRS.

*Learn from Campbell's successful migration of 15TB ECC, SCM and Live Cache systems to Azure cloud. Challenges overcome around combined unicode conversion. Innovative use of parallel export/import using FTP for data transfer of flat files to reduce the migration window to under 24hrs.*



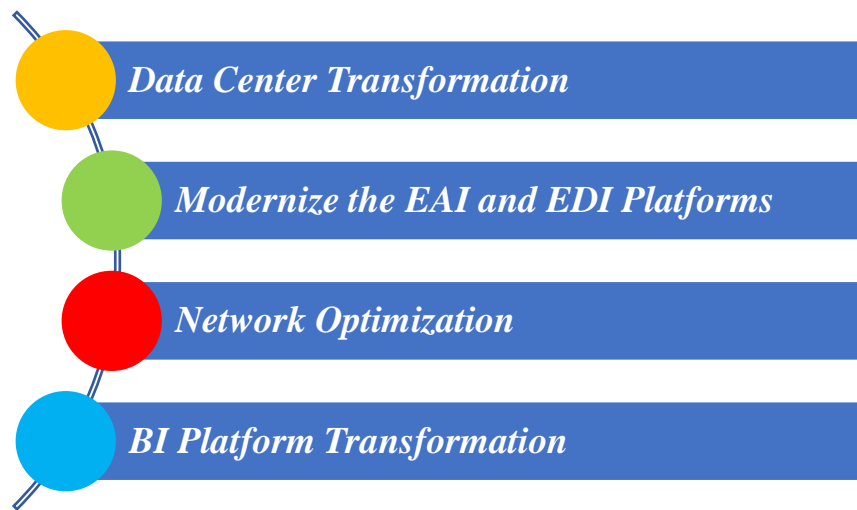
Campbell Soup Company is a multi-national food company headquartered in Camden, N.J., with annual sales of approximately \$8.1 billion. Campbell's focuses on Snacks, Meals and Beverages and is home to iconic brands such as Campbell Soups, Pepperidge Farm, Kettle brand, Plum Organics, Swanson, Prego, Pace, V8, Emerald, Snyder's Lance, and Pacific foods.

### **Business Challenges:**

After facing multiple downtime windows with their on-premises data center, Campbell was looking to transform and modernize their traditional data center and achieve improved reliability, high availability, greater resiliency, flexibility, & scalability to meet the growing / dynamic needs of their business. Reducing the risk from unstable and aging data center infrastructure was also a key consideration.

As part of this data center transformation initiative and migration to Azure cloud, the following steps were taken, Campbell also required to re-platform their BI, EAI and EDI platforms. Campbell partnered with IT Partner Khoj to achieve design and implement the Software Defined Data Center (SDDC) on Microsoft's Azure Cloud.

**The Campbell vision for migrating to Azure Cloud Platform was multifaceted.**



### ***GUIDING PRINCIPLES FOR MIGRATION TO AZURE***

*Azure will be primary cloud environment. All server workloads and network devices will migrate to the virtual appliance equivalent.*

*A colocation strategy will be developed for the minority of systems that will not migrate to the cloud such as AIX, Phone systems, McAfee SIEM, SWIFT VPN gateways*

*AIX DB servers will be transformed to Oracle on Oracle Linux*

*Any AS/400 systems will migrate to Infinite i on Linux*

### **Data Center Transformation:**

- Successfully migrate all systems, platforms, applications, and data to Microsoft Azure
- Improve reliability, higher availability, greater resiliency, flexibility, & scalability to meet the growing / dynamic needs of Campbell business.

### **Modernize our EAI and EDI Platforms:**

- Rearchitect & Re-platform EAI and EDI Platforms while migration to Azure.
- Improve integration capabilities: build interfaces faster with greater flexibility in our offerings, enable real-time / API based integration, with greater security.
- Migrate over 400 EDI trading partner maps to the new SAP Process Orchestration platform on Azure Cloud.

### **Network Optimization:**

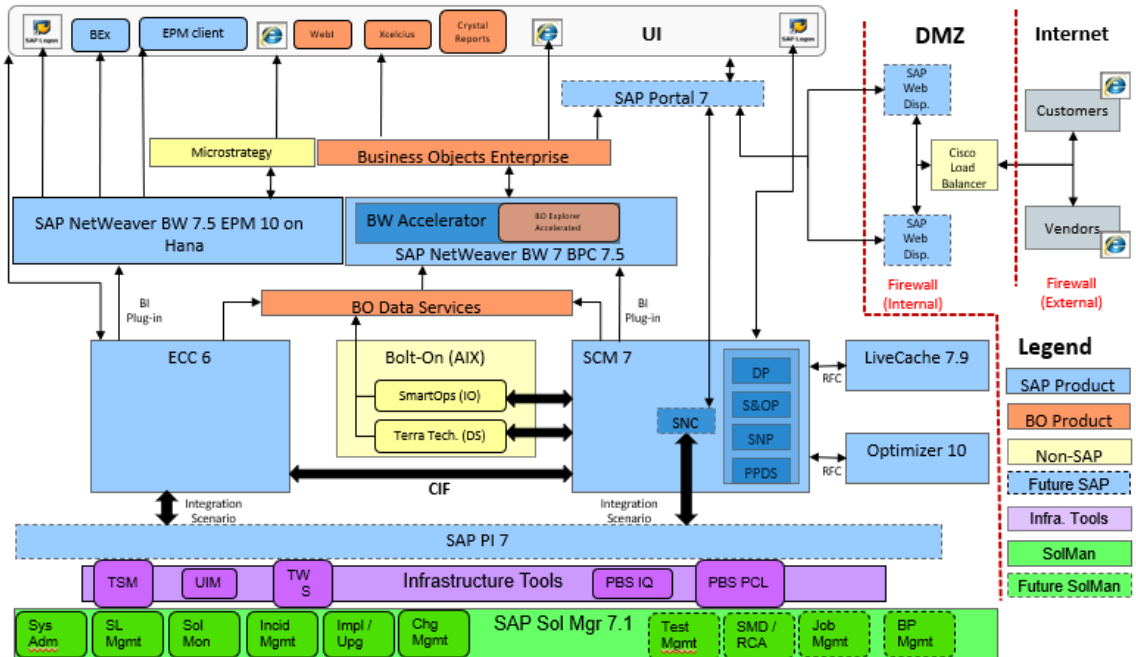
- Restructure network topology to optimize connectivity to the cloud, leverage internet / broadband connections, and improve connectivity options to get to Microsoft Azure environment.

### **BI Platform Transformation:**

- Along with migrating the data warehouse to the cloud, this transformation will include migrating the EDW away from Oracle into a new cloud-based platform. In addition to significant performance gains, Campbell will reduce operating costs and more importantly, create greater flexibility to support new data and analytics requirements.

### Scope and Approach:

The Campbell's Single Global SAP Landscape consists of major SAP Business Suite products and other Bolt-On Application Systems as depicted in the below diagram



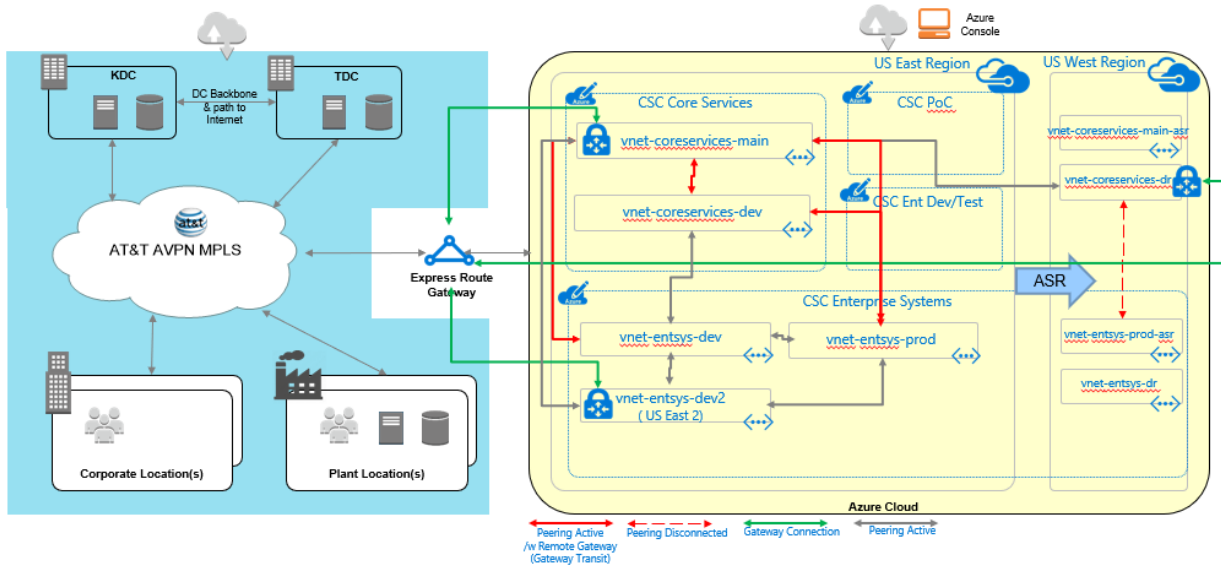
### Azure High-Level Logical Architecture

All Azure workloads were created in two separate subscriptions grouped and separated under Core IT services subscription and Enterprise Business Applications subscriptions. The team also built out a separate Dev/Test subscription for PoC (Proof of Concept) purposes and an isolated virtual network.

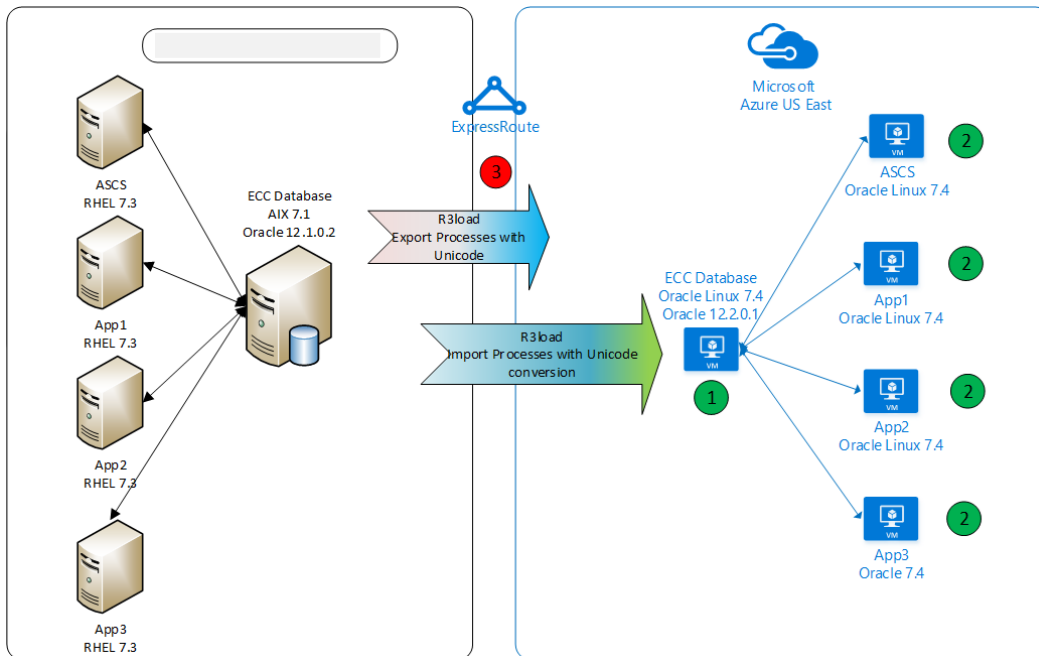
Azure Express Route Circuit was set up by partnering with Campbell's MPLS provider AT&T Netbond. An Azure Hub and Spoke architecture was designed with separate virtual networks created for Production and Non-Production workloads and VNet Peering was set up between the two networks. Network Security Groups were assigned at Subnet level for added flexibility and control.

All SAP Workloads were a part of dedicated Resource Groups and Production & Nonproduction Subnets. Dual Fortigate Appliance was leveraged as NVA in DMZ to inspect internet-bound traffic and expose SAP PO EDI incoming traffic to External Partners.

The DR (Disaster Recovery Environment) was implemented on Azure Paired Region USW using Azure Site Recovery Services for all the application Servers and SQL Server databases. However, for Oracle and HANA Database technologies, database aware replication technologies were used such as DataGuard for Oracle and Hana System Replication (HSR) for HANA, respectively.



The SAP Migration approach was based on R3Load Parallel Export with Migration Monitor and re-platformed the Operating environment from Oracle on AIX to Oracle on Oracle Enterprise Linux and SAP Netweaver Application stack on RHEL to Oracle Enterprise Linux.



## **Challenges Overcome**

Unicode Conversion was a requirement to meet the version dependency of SAP Kernel for Oracle DB on Azure cloud. Unicode conversion was combined with the R3load import process to reduce the overall downtime window.

Product support matrix for every 3<sup>rd</sup> party product and add-on was reviewed in advance to ensure smooth migration to Azure. Any compatibility issues were addressed in advance.

PAM was used to ensure that following three were fully compatible and supported: SAP Kernel, Oracle version and minor release and SAP support packages.

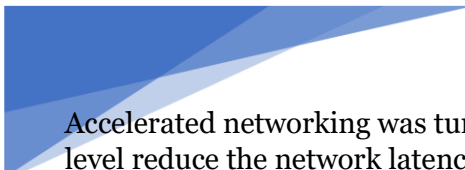
SFTP (as opposed NFS) using Migration Monitor was chosen as the protocol for transfer of R3load export data files to achieve the best throughput and to enable parallel export and import process of MPLS and Express Route.

Table export sequence and number of parallel R3load processes were tuned to achieve a healthy mix to fully utilize the Express Route bandwidth of 500 Mbps. Big table (top 10) were exported first (RFBLG, BSIS CHVW, GLPCA and VBOX etc.).

Every 20GB + table was split, max split was 64. Additional splits were avoided to prevent deadlock or locking contention. R3load were increased to 120 for export (for 108 CPU cores), and to 64 for import (32 vCPU VM). Oracle PL/SQL ROWID table splitting was followed for downtime table splitting.

R3load export was executed from a dedicated node to enhance the throughput. Additionally, the vCPU on both the source on-premises and target DB node were increased to handle the I/O intensive export and import processes.

To manage the disk throughput, IOPS and VM throughput requirements the VM type was chosen appropriately, and the 4 x 2TB data disks were stripped to achieve the throughput and IOPS requirements. 20 TB (10x2TB) of P40 premium storage was used to deliver the throughput required, even though the DB size was 15TB.



Accelerated networking was turned on at VM level reduce the network latency within Azure. Oracle Enterprise Linux kernel upgrade was required to turn on accelerated networking, while avoiding kernel panic situation.

Extensive multi-module automated performance testing had to be conducted to validate the system performance under load.

Campbell Soup went live with the SAP ECC, SCM and PO workloads on Azure on Dec 28<sup>th</sup>, 2019

## *Best Practices and Contributors to Success*

**Risk Mitigation** - Plan at least 3 dry runs of production to confirm all the cutover steps and timings.

**Focus** - Decouple Migration activities from HA and DR build for focused production migration activities

**Detailed Planning** – Detailed plans of over 150+ lines accompanied by playbooks

**Targeted Issue Resolutions** - ~80 issues were identified and resolved during the Cutover, Extended Functional Validation, and the 2-week Hypercare

**Service Disciplines** - Ensure strong foundations of the following areas

- *Technical Architecture*
- *Network Architecture*
- *Technical Security*
- *Enterprise Monitoring*
- *Backup and Recovery*
- *High Availability*
- *Disaster Recovery*
- *Performance Mgmt.*
- *Release and Patch Mgmt.*
- *Standard Operating Procedures*