



Change is never easy, but 50 years ago Sweden implemented an unimaginably complex change: They switched from driving on the left side of the road to the right side. Think about that for a minute, and what that would entail. The Swedes had to replace millions of road signs, rewrite traffic laws, repaint the roads, swap out traffic signals and rework all the roundabouts. Oh, and they had to rework all public vehicles, such as police cars and ambulances.

The most terrifying part? They had to implement ALL of these changes simultaneously (at 4:59 am on September 3, 1967). Phasing in a change like this would have resulted in chaos.

How did it go? Fantastic! Sweden actually saw a drop in accidents, presumably because everyone was so careful. The key was the months of very careful planning followed by disciplined and accurate execution. They named it “H-day” and it remains the source of intense national pride in Sweden.

One of our customers was recently faced with the challenge of migrating to the cloud their webMethods-based EDI hub that connects dozens of internal applications with thousands of external partners. As it turns out, their challenge had much in common with Sweden’s road switch. It required switching a highly complex system, with hundreds of moving parts, to a completely new way of doing things all at once.



Complex EDI Hub

To exchange the important business information each entity needs, our customer had set-up a complex EDI hub. That hub sits in a data center and comprises a wide range of webMethods applications. Running on AIX, this EDI hub serviced a variety of locations.

Decision to Migrate to the Cloud

The decision was made to migrate the EDI hub to the cloud to achieve a simpler architecture that lowered costs, increased security and provided more flexibility. Just as with Sweden’s H-day, they would need careful planning and expert execution to migrate their EDI hub to the cloud.

Candid

Atlanta-based Candid was selected to manage the migration. After looking at a variety of consulting firms, they were impressed with our combination of seasoned business consultants with its born-in-the-cloud “tech ninjas.” They felt Candid had both the business acumen as well as the technology skill to accomplish the migration.

Candid’s Cloud Migration Framework

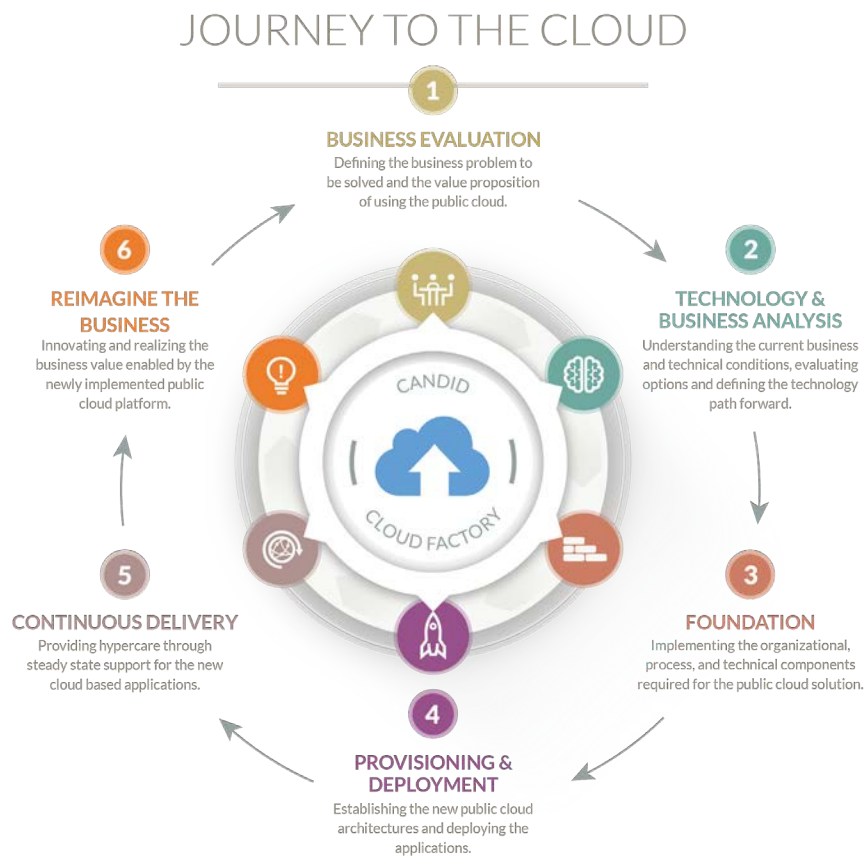
Candid has extensive experience migrating systems from data centers to the cloud. That experience has helped Candid build a rigorous framework for cloud migrations.

It begins with a full business analysis to set high-level business objectives. This had been done by our customer prior to Candid’s involvement. Therefore, Candid started the project with step 2, a rigorous technology analysis.

STEP 2: TECHNOLOGY ANALYSIS

In this step, Candid examined the existing EDI hub and made several key architectural decisions. First, we chose the Amazon Web Services platform to host the new EDI hub to simplify complex vendor integrations as well as comply with corporate security standards.

The legacy EDI hub was based on webMethods, a business-critical middleware application connecting dozens of internal applications with thousands of



Case Study: webMethods Migration

external partners. To successfully migrate the hub to AWS, the team had to:

- Architect the server layout
- Analyze each individual connection pipeline and understand how to make it work in AWS

Since their EDI hub is a business-critical application, it had to be architected as a DR0 application, which has the following requirements:

- Complete application restores within 4 hours
- Recovery point (RPO) of an hour or less

Achieving this would not be easy. Candid's plan was:

1. Analyze and document the infrastructure's current

state. This was difficult because there was limited documentation.

2. Leverage a NAS solution due to heavy use by multiple applications, both inside and outside the main VPC and over Direct Connect to the on-premise data center.

3. Remove the need for old VPN architecture that had many failure points and abstract existing direct connections to a standalone SFTP server.

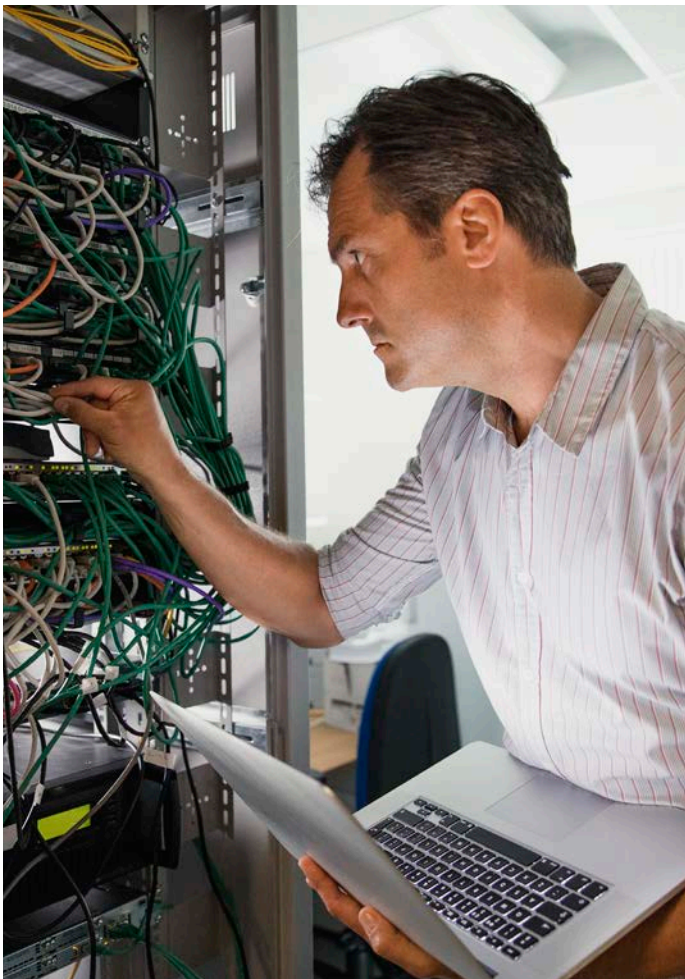
4. Work closely with other applications also going through migrations, so their old and new communication protocols were supported in the new environment.

5. Ensure all network rules were compliant with all protocols and ports needed to host middleware in the cloud.

6. Ensure that any single node on-premise application server was clustered to provide high availability.

7. Migrate the legacy database to RDS. The client used Oracle RDS even though the recommendation was to use Aurora or a separate SQL database (use of Oracle was an application requirement).

And, finally, Candid examined all the components of the existing EDI hub and created a master implementation plan which detailed the full rollout plan for each component.



STEP 3: PLANNING

Once Candid made the high-level technology decisions we spent time making detailed plans to ensure the migration would proceed smoothly. There were 11 individual applications and hundreds of entities depending on the data for their day-to-day operations. Any downtime during the migration would be disastrous.

First, Candid evaluated each of the existing webMethods applications. Were they still necessary? Several were not, and Candid advised against migrating them. Could they run as-is, or did they need to be recoded?

Candid noticed the existing EDI hub commingled resources for the various entities. This was a big issue for both security as well as system reliability. During the planning phase, Candid re-partitioned the existing webMethods environment into separate instantiations of the application for each business unit.

Finally, Candid streamlined several complex vendor integrations by:

- 1. Partitioning the existing webMethods environment into separate instantiations of the application for the business units.*
- 2. Decoupling of applications systems from webMethods through the creation of a Partner Landing Zone enabling a simpler network architecture.*

STEP 4: EXECUTION

Candid then began the process of migrating the EDI hub to Amazon AWS. One-by-one Candid migrated each webMethods application. We also coordinated the migration of multiple shared NAS volumes between webMethods and other systems. And, finally, Candid leveraged AWS KMS and Amazon EBS to comply with company security standards and reduced account provisioning complexity.

Candid utilized the following AWS services and third-party technology to architect the new EDI system in the cloud. Included in the list of components was the following:

- *Amazon Elastic Load Balancer (ELB)*
- *Auto Scaling Groups*
- *AWS Key Management Service (KMS)*
- *AWS Web Application Firewall (WAF)*
- *AWS Elastic Block Storage (EBS)*
- *Amazon Elastic Compute Cloud (EC2)*
- *Amazon Relational Database Service (RDS)*
- *Amazon Simple Storage Service (S3)*
- *Matter Cloud Automation Platform*
- *NetApp*
- *Puppet*

Once Candid completed migration of a webMethods' application, they were tested for functional accuracy to ensure it was fully compliant.



STEP 5: OPERATIONS

Candid had successfully migrated the complex EDI hub to the AWS cloud. However, according to Candid Cloud Factory, their job was not yet done. The next step was to work with our customer from an operational perspective. Here we performed training for the ops teams and fine-tuned the system to run effectively.

For example, Candid defined and implemented a series of best practices for post migration:

- *Amazon CloudWatch Logging*
- *Splunk for security and operational dashboards and analytics*
- *Continual optimization analysis to identify areas of excess capacity or allocation*
- *Tasking the application support team to monitor system events that could potentially cause a failure in service (and escalating where necessary to resolve those incidents)*

Migrating to AWS benefited our customer in many ways. Most notably, the large amount of data accessible at both the server and application level has led to the creation of Splunk alerts and dashboards that have transformed the primary 24/7 support teams. The ability for the NAS to add space dynamically has also transformed operations and has significantly reduced the amount of time spent analyzing storage space.

Our customer was also able to design how long it



retains data to give its internal stakeholders more visibility into business transactions that were not previously possible. This has reduced the amount of human interaction from the Operations team.

Moving to a clustered environment for one of the main business critical EDI applications has virtually eliminated direct outages for this application. Single nodes have failed at times, but the healthy node is able to take on the full load without business impact.

The main reporting tool used by the EDI shared service is now accessible over the Internet which wasn't possible in the on-premise environment. This has already resulted in an increased active user base of over 20 percent, reducing the operations team's workload.

STEP 6: REIMAGINE THE BUSINESS

Once a company completes a migration as complex and critical as the EDI hub, it is important to step back and evaluate where you have ended up. Does the new system allow for additional functionality or efficiencies that the client had not anticipated? Are there obvious next steps that would warrant specifying a new effort?

Results

The complete project lasted from November of 2016 to July of 2017 – a total of 9 months. The migration enabled the customer to achieve the goal of migration to a sustainable and scalable environment and at the same time reducing costs and risks through:

- *Architecture standards*
- *Automating security*
- *Enabling scripts*
- *DevOps continuous integration/continuous delivery architecture*
- *Streamlining complex vendor integrations*
- *Supporting overall data center exit strategy resulting in significant financial savings*



Lessons Learned

Having completed the migration, Candid sat down and took stock of the effort. What went well? What could be improved? Here are the lessons Candid learned during the process of migrating a complex EDI hub from an on-premises data center to the cloud:

1 Ensure dedicated network resources are available within your migration team.

Due to the complexity of several external connections, there were several last-minute networking changes before go-live that were critical to our successes. In general, you need to understand that system requirements change over time. You need to be prepared.

2 Understand system requirements change over time.

The legacy systems in the on-premise environment had a few complicated designs that were needed 5 years prior to our cloud migration but ended up not being needed anymore.

If we tried to build in some of these complicated designs, we would have made an overly complicated and failure-prone architecture that didn't solve any current business issues.

We surveyed close to 70 locations to ensure we could remove some of the complexity before finishing our design and it turned out to be a huge success and allowed us to simplify the architecture within AWS.

3 Maintain constant communication with impacted developers.

The applications Candid migrated impacted close to 30 developers who were working in business-critical projects that we couldn't impact.

We always knew that our AWS development and QA environments were basically production environments for our developers. We had to plan migrations and cutovers to ensure limited impact to all developers.

We also needed to ensure they received a regular update on our schedules and training, and we had to ensure timely delivery of any other impactful information.

4 Ensure you engage with business owners early.

There were about 30 locations with a shared application system. We worked with their IT vendor to discuss the endpoint changes very early on in the project since we knew this vendor was critical to our success.

We didn't bring in the centralized business owner for this vendor until months later which was a mistake. The IT vendor ended up requiring a massive upgrade to their software to enable the migration functionality, and we had to hurriedly escalate to ensure we stayed on track. This could have been caught much earlier if the business owners were involved from the beginning.

5 Client-wide decisions impacted application migrations.

The client made several decisions after our project kicked off that changed the course of the project. These were changes in how to bootstrap servers, the long-term NAS approach, and several other infrastructure items that were not decided before we built out the applications infrastructure.

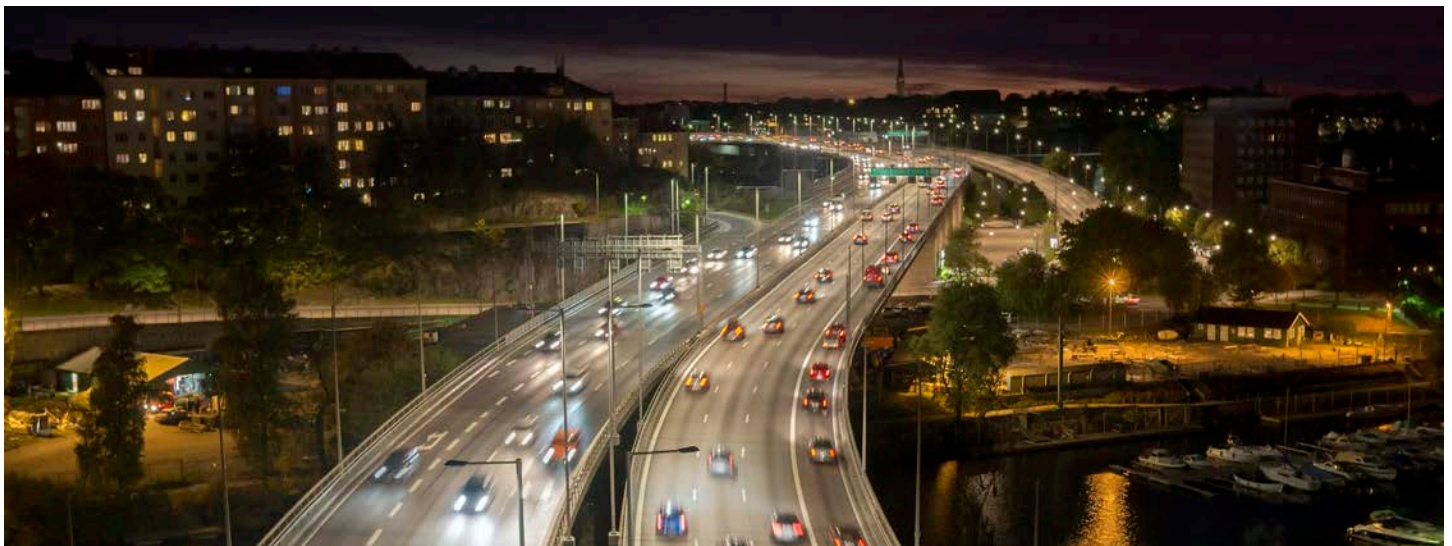
Every group was under aggressive timelines, so this was understood upfront. However, it would have been far better had the client made these major decisions prior to the application team completing the design process.

6 The Identity Management team needs regular involvement.

We were delayed several weeks (or months) due to not requiring access for our team members. We should have had dedicated involvement from the Active Directory and security teams during our project. Unfortunately, their availability was limited due to client restraints and that slowed our migration down.

Migration-Day

Just as Sweden accomplished a seemingly impossible migration 50 years ago, Candid helped our client migrate its highly complex and mission-critical EDI hub from an on-premises mainframe to AWS in just 9 months. As with Sweden's "H-day," all it takes is careful planning and expert execution.



CANDID

Contact Candid to find out how we can put advice into action for you.

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