Axeda®

10 Steps to a Successful Smart Services Evaluation

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Have you ever heard the story of the blind men and the elephant? In the story, six blind men were asked to determine what an elephant looked like by feeling different parts of the elephant's body.

The blind man who feels a leg says the elephant is like a pillar; the one who feels the tail says the elephant is like a rope; the one who feels the trunk says the elephant is like a tree branch; the one who feels the ear says the elephant is like a hand fan; the one who feels the belly says the elephant is like a wall; and the one who feels the tusk says the elephant is like a solid pipe.

A successful remote service solution has the potential to impact business processes in every part of a company. Like the blind men, the perception of remote services will depend on each stakeholder's own goals and perspective of where value is created.

Based on my experience with software evaluations over the past 7 years, I offer 10 suggestions for conducting a comprehensive evaluation of remote service solutions.

1. **Have a vision of what success looks like.** This will enable you to define goals and the outlines of the business case. The best programs are focused on creating strategic value.

2. **Work with a cross functional team.** Everyone doesn't need to be involved in every meeting, but having many different perspectives will help in making the right choice. Hey, which part of the elephant are you touching?

3. **Answer what's in it for your customers.** If you can't explain to your customers why remote services are good for them, they won't be motivated to help you make it happen. Which part of the elephant is most important to them?

Did You Know?

A successful remote service solution has the potential to impact business processes in every part of a company.

4. **Agree on a scoring matrix and an evaluation process.** Remote service products have a wide variety of capabilities and options. A well designed evaluation process will keep you on track and on schedule. It will also help your potential partners help you.

5. **Security protects you and your customers.** Does your industry have specific security requirements or concerns? Look for certifications and evidence that the solution exceeds the requirements of today and there is a plan for how to handle changes in the future.

6. **Scalability is more than just multiplication.** Things that don't seem like a big deal at 100 connected devices can become show stoppers when you hit 10 or 100 times that amount! How much network bandwidth, data/file storage, and system performance will you need as your device deployment grows over time? (Not all elephants are the same size.)

7. **Usability means user acceptance.** Pay close attention to the people that will use the solution every day. Does the user interface make sense to them? Can they do the job that is expected? As part of your scalability testing, see what happens to the UI with thousands of devices…

8. **Focus on Total Cost of Ownership.** TCO is much more than just the initial software and infrastructure costs. What are the development costs to integrate the solution into your products? Into your business systems? Into your operational processes? Don't build hopes and wishes into the cost line of your business case. (How much do elephants eat?)

9. **Software + Internet = Change.** You have to be able to upgrade software in the field without visiting every remote device (talk about a business case killer). You also have to be able to accept product upgrades without completely recompiling your system. Upgrades are an often overlooked component of TCO.

10. **Check References!** These are the people who have lived through the process you are entering. Learn from their experiences. Ask what they would do differently. Did their selected solution really deliver what was promised?

Step 1 Create a Vision of Success

Having a vision of what success looks like will enable you to define goals and the outline of the business case. The best programs are focused on creating strategic value.

If strategic value is important, we should start with strategy. You do have one, don't you? An effective strategy combines a measurable goal (where you are going), with a suggested method of accomplishing the goal (how it will be done), and a target to which the method will be applied (who you are doing this for).

Seems pretty simple, but so many companies never articulate their strategy. They wonder why the various programs, initiatives, and campaigns don't seem to fit together. It's like trying to sit on the three-legged stool that is missing a leg or two! You must have really good balance or accept falling over a lot.

What Are Your Goals for the Smart Service Program?

- Reduce the number of field dispatches by xx%

- Improve machine or device uptime by yy%

- Eliminate one no problem found call per service engineer per month

- Increase consumable sales by zz% due to increased system uptime

- Avoid adding additional staff (or reduce load on existing staff)

The key ingredient is that each goal is measurable and can be compared to a historical run rate. It is also important that each goal can be translated into a financial impact for the business.

Be Specific!

When you explain your strategy internally, it should be clear to everyone which customers you are targeting and why.

How Will You Get There?

The "How" is often a function of the goal and the levers that are available with which to impact the goal. Some examples may include:

- Perform software updates remotely
- Monitor known error conditions for patterns that indicate potential failure
- Remove the burden of data collection from machine operators during the troubleshooting process
- Enable customers to request help directly from the device
- Track device usage to help forecast consumable purchases or preventive maintenance

These don't have to be complicated, but they do have to be capable of being implemented in a cost effective way.

Who Is Served?

The final element, "For Whom," is often lost under the glamour of selecting or implementing technology. Nothing says a strategy has to apply to every customer. Many times it is far more effective to focus on the high value or high-cost customers first. Consider these examples:

- For customers with pay-as-you-go service contracts
- For customers in rural hospitals and clinics
- For customers that are more than 4 hours away from a field service office
- For customers under all-inclusive service contracts
- For customers with the X9000 Exterolizer machines

Be specific! When you explain your strategy internally, it should be clear to everyone which customers you are targeting and why. This will enable people involved in the project to independently make informed decisions and prevent expensive detours or mixed sales and marketing messages.

Let's Put It All Together in a Few Examples:

- "Improve machine or device uptime by yy%" by "monitoring known error conditions for patterns that indicate potential failure" for "customers under all-inclusive service contracts."

- "Reduce the number of field dispatches by xx%" by "performing software updates remotely" for "customers with the X9000 Exterolizer machines."

- "Eliminate one no problem found call per service engineer per month" by "removing the burden of data collection from machine operators during the troubleshooting process" for "customers that are more than 4 hours travel from a field service office."

Remember the three elements of strategy definition and you will be able to build an effective business case and communicate a compelling message to your management, project team members, and the marketplace. This core message is very important as you move on to the next steps of the evaluation process.

Step 2 Build a Cross-Functional Team

When evaluating Smart Service software solutions, it is critical to establish a cross-functional team. Everyone doesn't need to be involved in every meeting, but having a wide range of perspectives will help in accurately defining requirements and making the right choice.

Smart Service solutions have the potential to touch many different parts of the company. Support and field service may be the primary beneficiaries, but achieving success may also involve R&D, marketing, sales, manufacturing, product planning, and finance. The purchase decision is also competing with other financial priorities of the business. The cross-functional team provides a forum for proponents and detractors to have a voice in developing the proposed solution.

The output from the cross-functional team will be a proposal to the management team tasked with making the spending decision. The proposal describes the operational (business) need for the project, the recommended solution (with ranked list of alternatives or vendors), and financial calculations that clearly explain the program costs and expected benefits over time.

There are three dimensions that should be considered in building the ideal cross-functional team.

- Technical
- Operational
- Financial

Did You Know?

There are three dimensions that should be considered in building the ideal cross-functional team — technical, operational, and financial.

Technical
The technical element covers the traditional aspects of a technology purchase. For example, does the product meet the needs? Can it be integrated into the existing product and support business systems? Is it secure? But wait, how does the technical team know what the needs are? Without a clear set of needs and use cases, the technical team usually runs a series of experiments with the vendors trying to see which can jump over the most hurdles. Look for technical team members who can take a big picture view of a problem and balance technology issues with business needs.

Operational
The operational element is made up of the people who will actually use and operate the Smart Service solution. In many ways, they are the "customer" for the project. If the system provides value to them, they will use it.

It is critical to get a mix of product and support experts involved in defining the needs of the system. This should include people who handle front-line customer calls, service engineers who have to jump in their trucks and drive at a moment's notice, or the third and fourth level technical support team. They know what kinds of faults and failures occur in the field and what information they need to make faster diagnosis and better decisions.

Financial
The financial element is focused on converting the technical and operational issues into an ROI metric. Without this, it is difficult to make priority calls on whether a particular high-cost feature is required or a "nice to have." The financial members of the team don't need to be from finance or accounting, but they do need to understand the decision-making and budgeting process of the organization.

"Any strategic initiative should have an executive sponsor with a vested interest in the success of the evaluation."

Four Stages of Small Group Communication

When you bring your team together, remember the 4 stages of small group communication identified by Bruce Tuckman in 1965:

- *Forming* – Understand the challenges then agree on goals and objectives.
- *Storming* – Different ideas compete for consideration. Having a skilled leader or bringing in someone from the outside can help facilitate this process.
- *Norming* – Members will begin to adjust their behavior to meet the expectations of the group. The differences of opinion that were brought out during the storming phase are worked out.
- *Performing* – A team that reaches this stage operates with a sense of purpose and independence that enables progress and success.

In my experience, companies that do not use a cross-functional team to develop their program often take a very narrow view on the goals and objectives of the project. As a result, they have long evaluation cycles and then experience difficulty at the final decision stages where they need the support of upper management and other departments within the business. They also struggle during project implementation as "new" requirements appear.

Even where cross-functional teams are involved, I have seen cases where the members are not equally involved or committed to the project. As a result, the process is often skewed or falls prey to groupthink. This imbalance creates political issues within the decision process and can result in a project not sufficiently funded (or not funded at all).

Final Thoughts

Any strategic initiative should have an executive sponsor with a vested interest in the success of the evaluation. The executive sponsor should use their influence to get the participation of the other departments in the cross-functional team. The project leader should start by determining why each team member is there and if they are committed to the success of the team. If not, try to replace them. You want a strong team that shares a hunger for success. For team members, the reward of being on a successful team is recognition and new opportunity as others in the company look for winners to have on their own teams.

Step 3 Identify the Value for Your Customers!

Once your team is together, it's time to look outside your company to the real reason you are considering Smart Services in the first place — to help your customers!

Answer what's in it for your customers. If you can't explain to your customers why remote services are good for them, they won't be motivated to help you make it happen.

For Example…

Let's say you own a particular brand of car and you are standing in your driveway. Some guy with a logo for that brand of car on his shirt walks up and asks for your car keys. You kind of recognize the guy from the dealership where you bought the car, but you can't be sure. Do you give him your keys?

Most people wouldn't think of it. What is he going to do with the car? Is he going to drive it away? What are the risks? Are there any benefits for allowing this to happen? Can he be trusted?

Now imagine this conversation. You approach your customer and inform them of your new Smart Service offering. It involves connecting their machine to the Internet so someone can remotely work on it. Yikes! They ask themselves the same questions you did when the guy asked for your car keys!

There is not sufficient context around the request to elicit anything but a negative response.

"The secret to customer acceptance success is to walk in the customer's shoes and understand why and how remote service is valuable to them."

It doesn't have to be that way. Look at Microsoft with Windows update, Apple iTunes, and all the various anti-virus products. They all deliver remote service in the form of automated software updates to millions of computers every day. And they don't answer a lot of questions each time they do it either. Why? Because they offer a specific and well-understood benefit and do it from a position of trust.

The secret to customer acceptance success is to walk in the customer's shoes and understand why and how remote service is valuable to them. Then articulate that value in a way that means something to their business and to them personally.

Why Do People Buy?

I used to have a sales manager that said there were three reasons people bought something; to save money, to make money, and to stay out of jail. It's rather crude, but it speaks to the challenge. How will Smart Services help your customer achieve their goals? What's the best way to find out? Ask them!

Let's return to the car example. What if before the conversation your dealership had notified you of a new service program where they would change your oil when needed between midnight and 4 a.m. Or they would remind you when it was time to have major service performed? Or they would automatically upgrade the navigational system with new maps?

Now when the guy walks up, rather than asking for your keys, he asks if you have heard of the new service plan. Then he explains or reminds you of all the wonderful benefits of the plan. He answers your questions about risks and process. By now, convinced of the *benefits*, you ask how to sign up and what will happen. The "sale" is made.

**Answering the simple question
for your customers of
"What's in it for me?"
will result in motivated customers
that want to help you get connected
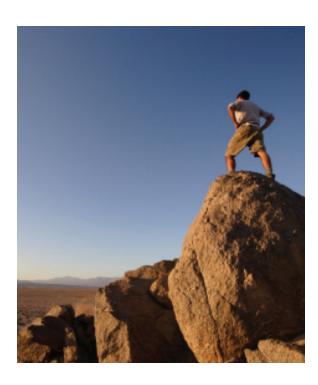to their equipment.**

Why is This Important to Your Evaluation Process?

First, it's important internally for gaining corporate support and funding. If you can't explain how Smart Services will help your customer and your business, then why do it?

Second, you want to measure features and functions that contribute to value. If I know what is important to my customer, I can determine what product features support that value. Data security? Network security? Changes to customer IT infrastructure? Deployment steps? How does each solution score on these key issues?

Third, customer acceptance is a critical success element for your program. The marketing and sales portion of the cross-functional team needs to understand the customer's view of value and how to address their concerns.

In the end, answering the simple question for your customers of "What's in it for me?" will result in motivated customers that want to help you get connected to their equipment. After all, it's a requirement to enjoy all of those benefits you promised!

Step 4 Define the Evaluation Process

You have your project mission. You have your team. You know how you want to create value for your customers. Selecting a Smart Service solution is probably a once-in-a-career activity for most people. How do you decide what capabilities are needed to give you the best chance for success?

Agree on a Scoring Matrix and an Evaluation Process

Smart Service software has a wide variety of capabilities and options. A well designed evaluation process will keep you on track and on schedule.

Think of the last time you chose a place to live or bought a house. You probably had some high-level items that were non-negotiable. Things like distance to work, number of bedrooms, price range, etc. For each house you visited, your first thought was how it met these high-level criteria. As long as there were no show stoppers, you were interested and wanted to investigate more.

The next level of details include things that are the most difficult to change. i.e., they are the things you have to be willing to live with as long as you stay there. For example, a busy street, a small backyard, or a strange room arrangement. You can't change them, so you create a mental score for each.

Finally you are left with things that you may like or not, but that you know you can change. It's nice if the seller has great taste in colors and you know you can move right in and feel very comfortable. If the colors are awful, you have to decide the "cost" you are willing to accept for adding a little paint or wallpaper to resolve the problem.

Identify, Divide, Score

You have to approach your Smart Service selection process in the same way. The cross-functional team needs to work backwards from the customer value and the internal business case to clearly identify the high-level items that the solution must have. (This generally ends up being the list you use to narrow the supplier list from many down to fewer than five.)

Now divide the high-level requirements into categories and create working groups of experts for each one. The working group needs to identify the more detailed requirements and create a scoring matrix for each. It is a good idea to pick a consistent scoring scheme for all categories so that everyone can get used to working in the same ranges. The working groups should also rank the importance of each requirement and apply an appropriate weighting factor. The idea here is to make sure that the truly important things get the most weight, but also allow less important items the chance to break the tie.

Get the team back together and go through the matrix line by line. Yeah, it is tough, but the exercise will help in two ways:

1. The team members will learn why each working group included a requirement and how they want to score them.

2. It's a good chance to practice articulating the requirements so that you can be very clear when explaining what you want to the prospective partners. That clarity will really improve the quality of vendor responses and the ability to get proposals that enable apples-to-apples comparison.

Once you receive the proposals, team members should INDIVIDUALLY score the proposals based on the criteria. Then bring the team back together to discuss the responses and raise any questions. Individual scores may be adjusted at this point based upon discussion.

> ## How do you decide what capabilities are needed to give you the best chance for success?

HOME	STEP 1 Create a Vision	STEP 2 Build a Team	STEP 3 Identify Value	STEP 4 Define a Process	STEP 5 Review Security	STEP 6 Prepare for Growth	STEP 7 Listen to Users	STEP 8 Focus on TCO	STEP 9 Expect Change	STEP 10 Check References	RESOURCES

Remember:

Decision making is often done at an emotional level and then we spend our intellectual energy building a justification of our feelings or gut decision.

Remember, decision making is often done at an emotional level and then we spend our intellectual energy building a justification of our feelings or gut decision. Having the cross-functional team involved in the process will help prevent this and help keep the decision focused on selecting the best solution that meets the requirements.

Some common sources of bias to watch out for as you collect requirements and scoring results:

- We tend to be willing to gather facts that support certain conclusions, but disregard other facts that support different conclusions.

- We tend to accept the first alternative that looks like it might work. Don't be lazy and just take the first answer.

- We often reject the unfamiliar or are unwilling to look beyond what was done in the past. Many great ideas are killed because someone says, "We tried that before and it didn't work." Ask, why not?

- We tend to attribute our success to our abilities and talents, but we attribute our failures to bad luck and external factors.

- We tend to place more attention on more recent information and either ignore or forget more distant information.

- There is a subtle willingness to believe what we have been told most often and by the greatest number of different sources.

- We tend to underestimate future uncertainty because we tend to believe that we have more control over events than we really do.

- To simplify an extremely complex world, we tend to group things and people. These simplified generalizations can bias decision making processes. Don't assume how something works — ask!

Knowing what features are worth will help you select the right product. It will also help later on in the process when making resource or planning decisions.

Step 5 Security Matters

Security is a not a feature, but a process.

Dictionary.com provides many definitions for the word "security." Two that are most applicable to remote service are:

1.   freedom from care, anxiety, or doubt; well-founded confidence.
2.   precautions taken to guard against crime, attack, sabotage, espionage, etc.

The first represents the desired result. The second is what you do to get there.

Any time you create the ability to reach into another company and collect data or perform actions, you have to identify and evaluate the security risks this could create. The assessment process of a remote service system includes the identification and analysis of:

1.   all processes related to the system
2.   threats that could affect the confidentiality, integrity or availability of the system
3.   system vulnerabilities to the threats
4.   potential impacts and risks from the threat activity
5.   selection of appropriate security measures and analysis of the risk relationships

Let's look at these one at a time.

"The only truly secure system is one that is powered off, cast in a block of concrete and sealed in a lead-lined room with armed guards."

— Gene Spafford

1. Processes

How are new users and devices are added to the system? Are there controls or processes around who can add or change the system? During the evaluation phase, it is most important to identify the processes and confirm the solution's ability to support them.

2. Threats

Security threats often come from an outside party that is working to disrupt or take over the system. However, they can also come from inside your company or at the customer location. Try to identify the various groups that would attempt to attack the system and what their means of access could be.

3. System Vulnerabilities

Vulnerabilities represent the "gaps in the fence" that would enable an attacker to gain entry into the system. It is difficult to evaluate this without a full scale security review. Axeda has contracted with Verisign to annually conduct a security review of the ServiceLink software and of Axeda company processes. It was not an easy or inexpensive process, but it is reassuring to know that an expert security organization such as Verisign has looked hard to find anything we might have missed.

Another area of vulnerability is outside the technology — the system's users. Many security failures are due to human factors such as using weak passwords or writing them down in obvious places. The ServiceLink software enables administrators to tightly control the privileges and visibility of devices in order to minimize this danger. We also include settings for how often passwords must be changed and automatic inactivity logout.

"No serious commentary will say that the user has no responsibility. We all have responsibilities to lock our doors in our homes and to buckle up when we get in cars."

— Spokesman, Information Technology Association of America, Business Roundtable, AP, May 19, 2004

4. Potential Impacts

Security has a cost. One of the challenges for evaluating security measures is to balance them with the potential risks or impacts of a breach. You may take a different approach to protecting temperature readings of a machine vs. the recipes that are controlling the machine operation. One is purely operational and the other may be expensive intellectual property or risk of machine damage. The amount of money and inconvenience you are willing to endure should depend directly on the calculated risk of security failure.

The FDA suggests[1] the following should be included in Software Hazard Analysis:

- A list of all potential hazards identified.
- The estimated severity of each identified hazard.
- A list of all potential causes of each identified hazard.

5. Select Appropriate Measures

Once the risks and hazards are identified (what) and quantified (how likely) you can develop a strategy for mitigation. This is a broad area that will require the combined expertise of the product developers, the regulatory or risk management department, and remote services users. An identified risk may be mitigated by changes in the product design, user training, or elimination of a capability. In the case of the FDA and medical devices, there is a regulatory requirement to perform this analysis. In other industries, it is a matter of good business practices, to protect both you and your customers.

If this all seems a bit deep for the remote service solution evaluation process, it's not. Security must be an integral part of the solution — not something to add in later. Better to spend some time identifying the risks and requirements now than be surprised later on.

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1 Guidance for Industry, FDA Reviewers and Compliance on Off-The-Shelf Software Use in Medical Devices, http://www.fda.gov/cdrh/ode/guidance/585.html

Security is a continuous process that spans hardware, software and humans. Just when you think you have everything covered, a new threat appears. It is important to evaluate how vendors manage response to security issues over time. What is the culture around security issues? Do they have a hot fix process? Is it possible to upgrade components already deployed in the field?

As a parting note, do not let security, as proxy for fear of the unknown, block progress on your remote service plans. Just because something bad could happen doesn't mean that you should stay in bed under the covers!

Good engineering and security practices won't help you know the unknowns, but they will give you the ability to deal with them when they do appear.

Step 6 Prepare for Growth — Scalability is More Than Just Multiplication

Things that don't seem like a big deal at 100 connected devices can become show stoppers when you hit 10 or 100 times that amount!

At Axeda, our most frequent competitor is engineering groups that think developing a remote service solution would be a cool project. After all, how hard can it be to whip up some web services and pass data between a computer and a server?

And it's true. That's not that difficult. But, there is so much more to creating an effective remote service solution. In addition to security, dealing with the challenges of the almost-but-not-always-on Internet, and a hundred other issues, there is scalability.

Dictionary.com explains scalability as "How well a solution to some problem will work when the size of the problem increases." According to Wikipedia, "scalability is a desirable property of a system, a network, or a process, which indicates its ability to either handle growing amounts of work in a graceful manner, or to be readily enlarged."

Dealing with a handful of systems in a lab environment is manageable. But, as you move out into the real world and the number of connected systems grows, there are architecture bottlenecks that pop up. Database activity grows. Multiple activities demand database access at the same time, leading to deadlocks or delays. The server gets overloaded and now you need to clustering. What looked like a quick project begins to grow roots and become permanent as developers spend more time resolving performance issues than developing new functionality.

Did You Know?

The more devices and traffic there are — the more web servers and application servers are needed.

And what about the user interface? That user interface with drop down list boxes or large tables looked great with <100 devices, but what happens when there are 1000, or 10K, or more?! How do you manage finding or presenting data from that many things in a way the users can handle? Here at Axeda, we went through multiple generations of UI design before we found a model that can meet the needs of a growing device population. That takes time and effort.

Scalability also translates into IT infrastructure. The more devices and traffic there are — the more web servers and application servers are needed. The database servers and associated storage also must expand to meet demand. Axeda's ability to deliver our software in a Software as a Service (SaaS) model has eliminated this concern for most of our customers. The accumulated experience of our hosting ops and R&D teams enable us to deliver >99.9% of availability.

As you focus on scalability during your evaluation, consider the following:

- How many remote assets will be connected?
- What quantities and frequencies of data will be transmitted to the central server? What about file transfers? And access sessions (e.g., desktop sharing)?
- How many users will be on the system at peak times? How active will they be?
- What level of rules processing (evaluation) will be done? What about integration with other systems?

Evaluate the application user interface and look for places where the UI will become difficult as the number of assets increase. Pay particular attention to user management as the complexity often grows as the number of assets and users increase.

Every remote service program starts with that first asset deployed in the field. Successful programs choose technology that will handle the nth asset just as quickly and effortlessly as the first one.

Step 7 Listen to Your Users

A shoe may be used to drive in a nail, but does it have usability?

Wikipedia defines usability as "a term used to denote the ease with which people can employ a particular tool or other human-made object in order to achieve a particular goal." Almost anything can be made into a tool. The focus of usability is on how easy that tool can be used to accomplish the desired objective. Which has better usability for driving nails — a shoe or a hammer?

I have had the occasion to interview web designers and user interface (UI) engineers. One of my favorite questions is to ask them for a web site they think is really well designed and one that is not well designed. I then have them justify their selections. It gives me some insight into how they evaluate the user experience. Some prefer sites that are focused, easy to navigate, and surface information in an expected way. Others value information over graphics.

We have all experienced software or web sites that seem to read your mind. Needed information always seems right at hand without requiring you to read the whole page. You finish your work quickly and in a positive frame of mind. If a site is bad, you avoid it unless absolutely necessary. If good UI is so obvious (and so important), why aren't all products or web sites well designed?!
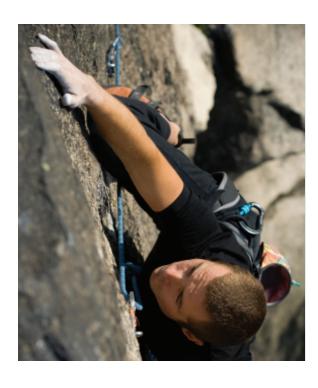
The reason is people! They have many similarities, but they each see the world through a different set of eyes. They may also have different goals or objectives for their use of the system.

"Take the time to understand your user community and their expectations."

Take the time to understand your user community and their expectations. Will they use the system every day or only on an occasional basis? Are they after detail or simplicity? Do they prefer text or graphics? Are they self motivated or being pushed? The answers to these questions may impact what level of complexity or navigation they will be comfortable with.

A useful model for solution evaluation is to first define the expected workflows. For example, an asset has a problem. How is the user informed of the problem? What are the steps and information necessary to diagnose the type of problem? How do you determine root cause? What are the options for repair? What people, systems, and other processes are involved or impacted by the workflow? Create a written summary of each workflow with emphasis on the information required to perform each step.

With workflow summaries and user characteristics in hand, you are now ready to approach the solution UI and judge it for usability. Have your user community involved in the evaluation. This will help you better understand their needs and they will have more ownership of the selected solution. Walk through the workflows for each solution under consideration. The scoring is simple — does the solution make it easy for people to accomplish their particular goal?

Step 8 Focus on Total Cost of Ownership

Total Cost of Ownership, or TCO, is a common method used to evaluate the expected lifetime or ongoing costs of several alternative approaches. Pioneered by Gartner more than 20 years ago, the Gartner TCO model takes into account four broad categories of cost: capital, IT operations, administrative, and user operation. A recent Gartner press release provides the following example. "For a large company, the cost of purchasing a desktop PC may be only $1,200, but, kept for four years, the total cost of ownership (TCO) could be as much as $5,867 per year…" Note how the operational costs can accumulate over years and overwhelm acquisition costs. Calculating TCO can help you better understand and compare the costs beyond the initial purchase.

For this discussion, I am going to simplify the Gartner model and focus on acquisition costs, implementation, and operation.

Acquisition costs include everything it takes to purchase the solution components. This will include buying the software license, infrastructure hardware (e.g., servers, storage, load balancers, routers, etc.), and infrastructure software (e.g., application servers, database servers, backup and recovery tools). These items are often where all the focus goes during the decision and purchasing process, and they are important, but they may represent less than 30% of the TCO.

"For a large company, the cost of purchasing a desktop PC may be only $1,200, but, kept for four years, the total cost of ownership (TCO) could be as much as $5,867 per year…"

Implementation costs cover the wide range of expertise necessary to assemble the components into an operational solution. This starts with the solution design process in collaboration with all of the players that will be involved. Once the plan is in place, there may be internal and external resources required for the software development necessary to configure or customize the software to the field devices. It will also include the IT experts necessary to set up the equipment in the data center, configure it, and then test. There may be subtle, but significant, differences in the implementation and assembly costs for each solution so pay attention to the details.

There is another set of costs that is similar across any of the solutions being evaluated. These include the end-to-end testing (and validation for some regulated industries), marketing and promotional costs, and internal adoption programs. You should account for these in your budget, but they only need to be included in the TCO comparison if you believe there is a significant difference between the options being evaluated.

Operating the solution over time can represent a cost that is many times the initial investment. Operating costs may include any of the following:

- Hardware and software maintenance fees
- Infrastructure operations costs
  - Floor space costs
  - Electricity and cooling
  - Internet connection and bandwidth
  - Server hardware and software costs
  - IT personnel costs (you may need portions of networking, server, security, and database resources)

- Upgrade costs (for hardware and software)
- Scaling costs (more infrastructure needed as the number of assets or users expands)
- Backup and Recovery Process costs
- Costs associated with failure or outage
- Technology training costs of IT support staff
- Training for application users

One of the major drivers for Axeda to offer ServiceLink under the Software as a Service (SaaS) model was to help customers reduce their TCO. Use of Axeda On-Demand removes the need for customers to purchase server infrastructure, train IT staff to manage the solution, and handle the process of version upgrades. An added benefit is that the hosted environment has proven to have higher uptime than our customers were experiencing in their own data centers.

Don't forget about the cost of feature requests or enhancements over time. Give some consideration to how much effort will be required to develop customizations and then to deploy them (both at the Server and Agent levels). This can be a huge impact when considering internal development as one of the options. Is it core to your business to take on the cost of development or can you take advantage of the shared costs a purchased solution provides?

Once you have your estimates for each category, you should be able to assemble a TCO over the first 3 to 5 years. The totals are important, but also use this exercise to help understand when costs will occur. This information and insight will be extremely valuable when you are finalizing your business justification for the project and presenting the program to management.

Step 9 Reality + Experience = Change

"We measure our reality according to our experience. As our experience expands, our reality is also altered." — Chin-Ning Chu, Business Author and Management Expert

I ran across this quote and thought it perfectly summarized the life of a remote service program. All programs begin with a goal. That goal leads to a set of requirements or constraints that define the solution. Once the solution is deployed, the process of experience begins. Only then do you begin to learn what you didn't know that you didn't know.

We see this often at Axeda as we work with new customers. A set of data values are determined to be important sources of diagnostic information or business value. As the support engineers work with the data provided, they begin to learn new things about how the connected assets operate in the real world. It may be alarm conditions that occur more (less) frequently than expected, a particular variable that doesn't correlate to a problem cause, or some variable that is useful but not recorded frequently enough.

At the same time, the support engineers find that there are problems for which the existing variable sets are not helpful or definitive enough. The problem may be detected, but you can't tell which subsystem is actually the root cause and thus what parts may be needed to affect the repair. This leads to a wish list of desired variables. In many cases, the team looks at the list, does a virtual slap on the head, and says, "I can't believe we didn't think of that one!"

What next? Everyone looks at the leader of the remote support program and asks the obvious question, "Can you drop these variables that we don't need and replace them with the ones that we do need?"

"Can you drop these variables that we don't need and replace them with the ones that we do need?"

This is one example where you need the ability to not only change the Agent functionality, but also to cost effectively deploy those changes into the field. The remote service program should not create the need to dispatch technicians just to solve problems with the system that was supposed to reduce dispatches!

The solution requires intelligent Agent design and software update tools to push out new updates. The Agent must be capable of being updated while it is running, i.e., you have to use the Agent to transport the updates and then reliably execute the update without losing communication with the server. Otherwise, you just bought an extra service dispatch.

The system must also have the tools to manage software updates so you can know Agent versions and which versions have been upgraded. The software update process has to consider how updates are defined, tested, and deployed.

Let's look at an example. A new variable is to be collected and reported by an Agent. With Axeda ServiceLink, this usually requires the distribution of new Agent configuration file(s). Step 1 is to create the new files and run them through the full testing and validation process. Once the new configuration files are released, they can be packaged into a software update. The package should include checking for prerequisites, file management, file upload/download, and update execution, all while reporting status. The completed package should then go through a round of testing and validation with special attention to handling any edge cases that may be found in the deployed systems (e.g., different file paths or file locks). Only when the package is fully tested should it be made available in the system for deployment.

It is important to consider how updates will be deployed. In some cases, an update should be sent to every Agent in the device population. In other cases, you may only want to send it to a particular region, customer, or only as the result of a support case. Pushing updates may be something that is limited only to specific people or under a controlled procedure. These choices may flow directly into the decisions around user management and privileges.

One last area to consider is the impact to customers as they receive a new update. Some may be able to take an update any time the machine is in Standby mode. Others may have strict requirements that an update can only be applied during a Scheduled Maintenance window. Others may only want to receive an update under control of a local attendant. The software update process should account for this user input and operate accordingly.

The Internet is a dynamic place. Things change all the time. Your knowledge of how your machines or systems work in the field will also change as you gain experience. The remote service evaluation process should carefully consider the options around how Agent updates will be managed. Assuming an asset life of three to ten years, the change management and change deployment process can have a dramatic impact on the total cost of ownership of the remote service program.

Step 10 Check References!

You wouldn't hire a new employee without checking their references, would you? It seems obvious that you would take the same time and care when selecting a strategic business changing technology such as a remote services system. The only real question is who you should talk to and what you should ask!

A reference should be someone who has already walked the path ahead of you. They have a system, it has devices deployed in the field, and it is actively in use. The purpose of the reference call is to evaluate the vendor, but don't be afraid to see what lessons you can learn along the way. Ask for references from the vendor, but also take advantage of various M2M or remote service shows. These are often great opportunities to meet and speak with many companies in a very short period of time.

Vendor performance for enterprise software comes down to three key elements:

1. Does the product do what it is advertised to do?
2. Was the implementation process performed competently, on time, and on budget?
3. Does the ongoing support provide timely answers and fixes (if needed)?

Product
If there are specific functions that are critical to the success of your project, ask for references that use those features. The real world may reveal unexpected constraints or benefits that were not obvious during your evaluation.

"Ask if your reference feels they are dealing with a vendor or a partner."

Implementation

Getting a good read on the implementation process is probably the most difficult aspect of reference checking. Success is often as much a function of the ability of a project team to negotiate internal politics as it is of the vendor's people or methodology! For example, during a panel discussion at an Axeda user conference, four of our most successful customers all agreed that executive commitment to the project was their biggest key to success.

All that work you did during the evaluation phase can really pay off during implementation. If you have done your use cases, involved your stakeholders, and purchased a product that can meet the key requirements, the implementation will be straightforward and with low risk. Ask your reference contacts how they interacted with the vendor's implementation team and what lessons they learned.

Support

Measuring ongoing support is a challenge. Support cases are often managed under a period of duress and imperfect information. Were questions understood? How long did it usually take to diagnose the problem? Are the support tools sufficient and easy to use? If a software change was needed, how long did it take? With the increasing use of social networking tools, does the vendor have an active community of users who are willing to share their experience?

Most of all, ask if your reference feels they are dealing with a vendor or a partner. In a partnership, both sides work together for the mutual benefit. Axeda management stresses partnership and customer success as an integral component of our corporate culture. Sure, we don't do everything perfectly every time, but we never forget our mission of customer satisfaction. That's one reason I'm not afraid to write a blog about asking for customer references!

To help keep customer success on top of every employee's mind, Axeda regularly asks our customer's one simple question, "How likely is it that you would recommend Axeda to a friend or colleague?"

When you do your reference calls, you are invited to ask the same question.

For more information visit our website
www.axeda.com

Randy Thompson, Director of Technical Account Managers, Axeda

Joining the company in 1996, Randy Thompson is one of the most senior employees at Axeda and has been involved with the sales and implementation of Axeda remote service technology since its inception. He currently has worldwide management responsibility for a highly experienced team of presales engineers and is often on the leading edge in introducing new Axeda products into the market.

Randy holds an MBA from Bryant College and a BSEE from the University of Texas.

About Axeda

Axeda Corporation is the leading Platform-as-a-Service (PaaS) company for connected products. The company's VeriSign® Security certified platform and applications allow companies to connect, manage, service, and interact with assets anywhere — it serves over 100 of the world's leading enterprises including Agilent, Diebold, and EMC. Axeda Corporation is a privately held company headquartered in Foxboro, Mass. and can be reached at **www.axeda.com**.

Additional Resources

- White Papers and Recorded Web Seminars
- Customer Videos and Case Studies
- Corporate Website
- Axeda Developer Connection Program