SELF SERVICE ACTIVATION
A FIELD STUDY OF HIGH-SPEED DATA (HSD) SELF INSTALL

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Abstract

In September of 1998, MediaOne began a field study of self install. This study was unique because the customer actually performed the wiring necessary to activate HSD services. This paper will review the details and findings of this study and provide direction for those seeking to further their own self service program.

SELF SERVICE ACTIVATION

Background

An ever-present fact in our business is that Multiple Subscriber Organizations (MSOs) must continue to grow their subscriber base. However, to insure profitability, MSOs must begin to streamline customer activation and technical support obligations by augmenting personnel with technology wherever possible.

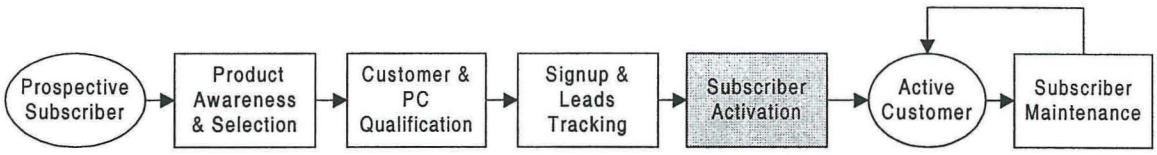

Figure 1.0 Customer Care Process

Figure 1.0 represents the complex sequence of events that each potential customer must experience. Today, many MSOs must rely on their internal employees to process each phase of the customer care process. If unaltered, this single fact will continue to limit their ability to scale the business.

The long term goal of many MSOs is to provide an efficient self service environment for its customers. Although this self service environment is initially intended for high speed data (the focus of this paper), it could eventually support all products that utilize the broadband pipe (i.e. HSD, core video, telephony, etc). The self service environment is not intended to replace "traditional" MSO installations with self service installations. Instead, the self service environment merely provides additional installation and support options for its customers. The combination of the proposed self-service environment as well as other MSO employee driven efforts to install and support customers will provide a more scalable and cost effective solution for expanding the Internet service customer base. The result of customers choosing some or all of these options will be an increase in overall customer care efficiency. The following list highlights some possible metrics that could be used to develop a self service program:

- Installation Time
  Time it takes for an MSO field representative to complete a high-speed data installation.

  The addition of a self service (self install) should impact average installation time because the more a customer can do on their own the less time MSO personnel are involved.

- Average Installation Cost
  The average cost to an MSO for each subscriber installed.

Since the average installation cost represents ALL high-speed data installations, this figure should decrease as the number of self installations increase (see note below).

- Percentage of Customers Self-Installed
  The portion of the total number of high-speed data installations that were completed entirely by customers.

  The availability of a fully functional self service environment should enable an increasing number of self installed customers.

- Support Calls per Customer
  The average number of support calls taken per customer.

  As the number of maintenance tools become available through the self service environment the average number of support calls per customer should decrease.

Note that building this technology (i.e. self service environment that supports self installation) does not in itself guarantee that it will be used by either new or existing customers. Therefore a more in-dept analysis should be conducted to determine what actions an MSO should take to encourage the use of self service environment and self service activation (i.e. marketing and other incentives). The field study outlined by this paper merely provides an introduction into the dynamics of self install. It is strongly recommended that further study in this area be combined with developing applications that provide self service functionality (i.e. activation and maintenance tools).

A self service environment must address all aspects of the customer care process and allow customers to independently select and then activate their Internet or other services. Once activated, the self service environment must enable subscribers to make specific maintenance modifications to their Internet service account without a call to a MSO's Technical Support Organization. Subscribers should have the ability to perform all necessary activation and maintenance operations via a convenient platform independent (web browser) application. While this document primarily focuses on self service activation, most of this functionality can also be used to provide self service subscriber maintenance (changing e-mail passwords, swapping network cards, etc). Achieving self service subscriber activation involves automating existing "manual" activation tasks in Table 1.0. It does not include wiring the home and installing the network card in the subscriber's computer. This will be the customer's responsibility (self install) or a MSO's installation technician's responsibility (traditional installation).

Task Type:	Description:
Manual	Wire outlet (if necessary)
Manual	Install NIC
Manual	Create a user ID
Manual	Provision services
Manual	Active service
Manual	Test service
Manual	Train customer
Manual	Complete paperwork/check-in

Table 1.0 Activation Tasks

It is important to understand that simply allowing a customer to activate their Internet service on their own is *not* synonymous with the primary goal of self service activation but rather just an additional way of installing a HSD customer. In the end, the *best* self service activation program is one that supports a variety of self install options for customers with varying amount of support from the MSO. A phased approach could continually add self install options that provide a decreasing degree of MSO support.

The initial phase of this plan was to complete a field study to learn more about the dynamics of self install.

FIELD STUDY

The objective of MediaOne's field study was to provide a means by which technically skilled individuals could wire, install, configure, and activate their HSD service on their own. This option supplies qualified individuals (skilled in wiring and computer configuration) with an install kit and instructions that they could check out from a MediaOne service center. Next they went home and installed the service at their convenience. Once complete, all customers completed a survey in which they were able to provide feedback on their comfort level with the self install. The survey results were used to help determine the proper costs (i.e. motivation/incentives mentioned earlier) for this option as well as how the option may be improved.

Note that a by-product of the field test enabled MediaOne to begin looking at comparative costs of traditional installs vs. self installs to determine what cost MediaOne incurs for each of these options, what are the tradeoffs and any potential savings. This subject will not be addressed in this cover but was explored as part of the study.

Field Study Environment

The field study took place in MediaOne's Minnesota region. The Minnesota region consists of approximately 571,000 homes passed, all of which are HSD capable. Minnesota had recently launched one-way HSD services which were available to all the 571,000 homes passed. Minnesota's one-way HSD service consisted of using a one-way cable modem that received its downstream bandwidth from the cable line with a telephone line to accommodate its upstream bandwidth. The maximum possible throughput of the HSD product was approximately 1,500,000/33,600 bps.

Due to the recent launch of HSD services, new signups were being scheduled up to three weeks in advance. Since a majority of the "earlier-adopters" were technically savvy, many of them asked if they couldn't just do this install themselves. This initial demand by customers prompted MediaOne to begin the field study to help these customers get HSD more quickly, and to answer lingering questions about the viability of self install.

A project plan was developed to conduct a self install field study which included documentation and coordination for the involvement of MediaOne telephone representatives (Tier 1) and field fulfillment.

Goals and Anticipated Results

As MediaOne entered into the study there were two goals in mind:

- Save the company money
- Increase the number of installs the same number of field technicians can do in a day

Self service is a high profile topic within MediaOne and this field test was greeted with much enthusiasm.

Self Install Process

Upon approval of the project plan, more detailed processes were developed to assemble kits, create a survey, and manage the distribution of the self install kits. As a result, several steps were defined for activating a self install. These steps are as follows:

- Qualify customer skills/dwelling

- Initialize billing account and HSD services (select email names, etc)
- Schedule a "traditional" HSD install (see fail-safes below)
- Arrange for pickup
- Customer comes to service site to pick up kit
- Customer signs service contract and equipment release form
- Local coordinator reviews install steps with customer.
- Local coordinator ensures customer's account is established and "ready" (will enable customer to receive Internet service once install is complete)
- Customer returns home to install kit
- Once complete, customer completes on-line survey
- Completed survey informs Tier 1 who closes the install (No Truck), cancels the "traditional" HSD install, and activates the discounted service
- Tier 1 sends notification to customer informing them they received their survey, cancelled their scheduled install, and have applied a discount

Qualifications

Since the installation documents were not geared for casual to average computer users (many troubleshooting steps were NOT included), some level of qualification screening was needed to ensure that every customer was technically skilled to carry out the installation process and that their home was capable of supporting the service (i.e. already had CATV). The following is a sample of some of the questions asked customers to ensure they would be able to perform a self install:

- Does customer currently have MediaOne CATV?
- Is customer comfortable opening a computer?
- Is customer experienced in resolving IRQs?
- Does customer know how to back out of changes made on a computer?
- Does customer have a browser installed in their computer?
- Does customer know how to terminate CATV wire?
- Does customer have access to the necessary tools (listed in manual)?
- Would customer like to participate in the test, complete survey, etc?

If the customer answered yes to all these questions they were accepted into the self install test group and proceeded with the next step in the self install process explained previously.

Fail-Safes

Additionally, several measures or fail-safes were developed to ensure that the self install ended with a satisfied and working customer. The following fail-safes were put in place:

- When the customer selected the self install option they were scheduled for a "traditional" MediaOne HSD install. This date served two purposes. First it preserved this customer's installation priority allowing them to be installed at that date if they elected not to proceed with the self install or were not able to complete it. Second, it served as an end point for the customer's potential opportunity to be part of the test group and thus be eligible for the discount. If the MediaOne install date had arrived and the customer had completed all or part of the install (successfully and correctly) they would only be billed for the portion that MediaOne had to complete, but would not be considered part of the self install test group and would not receive the discount.

- If the customer was unable to complete the install due to some other reason (computer was buggy), they could request a service call from MediaOne to complete the install. In this case, if the service call was minor the customer would just be charged time and materials but would remain a test group participant and thus receive the discount. If the service call was more like a full install, the customer would be charged for an install and be excluded from the test group and its discounts.
- If the customer received the kit but decided that they no longer felt comfortable with the CATV wiring, they could elect to have MediaOne install an additional outlet (AO). Since an AO service order would come from the core video side of MediaOne this request could likely be serviced before the HSD install date. The customer would have to complete the CPE installation and configuration and ensure the CATV was connected per the self install kit instructions. Once complete, the customer would only be charged for an AO service call which is generally cheaper than an HSD service call.
- If, for whatever reason, the customer suspected that any component in the self install kit was defective, the customer could freely replace the component at any MediaOne service site. To replace the components, a customer would present their self install agreement and the suspected defective part to receive a new one.

Providing fail-safes allows more people to become part of the test group while incurring minimum charges in exchange for MediaOne performing some parts of the install. As a result, the self install would still represent a savings to the customer however, it would be less of a savings had the customer performed everything without requiring MediaOne intervention.

Self Installation

An important part of the qualification/scheduling process was that the customer selected an email account over the phone. Once this email account was created, the customer was effectively pre-authorized (advanced authorized) to use MediaOne Internet service. The email username and password selected by the customer allowed them to access the service from their home once cabling and computer configuration was complete. This step was confirmed by the local coordinator before the customer left the service site. Additionally, the Tier 1 person recommended the customer do some general measuring in their home before coming to pick up the kit. The general measuring allowed MediaOne to provide the customer with lengths of wire most suitable to their dwelling. MediaOne offered to provide the customer with any length of wire they felt they needed to proceed with the install.

During the actual installation activity, the customer merely followed instructions contained in the kits and connected the "pre-terminated" wire lengths as instructed. Since the RF portion of the self install contained the most critical steps, highlights of these steps are covered in this document. The goal of the RF installation doc was to have the customer make "home-runs" from where the MediaOne cable entered their premises (MediaOne de-mark was the ground block) to the room where the cable modem would be placed (see Figure 2.0).

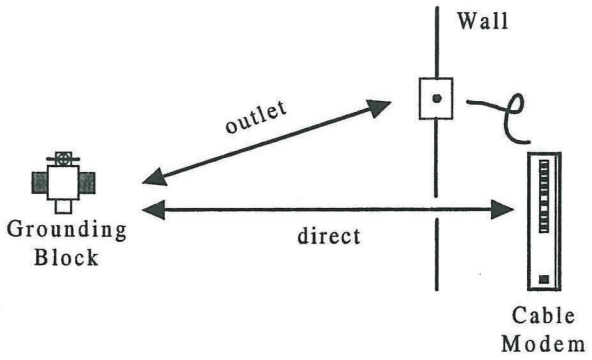

Figure 2.0 Self Install Cabling

By making these cable runs and following additional instructions the dwelling would be capable of both one-way and two-way cable modem service. At the de-mark, the wire leading to dwelling's video distribution system (some kind of splitter) was re-routed through either a direct coupler (DC6) or a standard two way splitter depending on signal strength (see Figure 2.1).

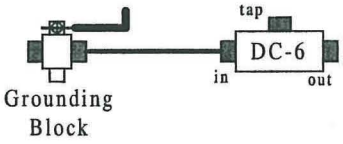

Figure 2.1 HSD Splitter Connections

The splitter/DC6 was then connected to the home run lead from the cable modem and a high-pass filter connected to the remaining receptacle (see Figure 2.2).

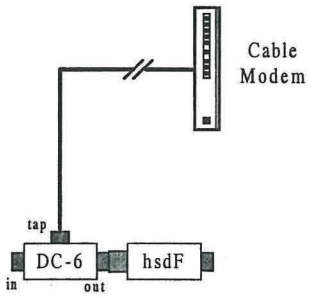

Figure 2.2 Use of High Pass Filter

The use of the high pass filter (an ingress or leakage preventative device) prompted two very strong opinions on the subject. There are those that believe that "good" RF plant operations and maintenance can prevent the need to use filters. There are also those that believe that trying to maintain RF without using filters is unachievable (see additional note below). At present there is no strong evidence that either opinion is correct. However, since MediaOne already is committed to using filters, this practice was rolled into the RF installation instructions.

Note that the benefits of using filters can be overshadowed by the problems they cause for self service. Use of a high pass filter anywhere between the customer cable modem and the broadband plant can terminate the HSD service. It can also prevent self service installs if this filter is placed out-of-reach of the customer (i.e. at the pole). In the proposed next steps section of this document, some ideas are discussed which address this problem and allow high pass filters and self service to exist in harmony.

The other side of the high pass filter is connected to the video distribution system (see Figure 2.3). Note that this area between the high pass filter and the video distribution system is where traps and amps can be placed (use of traps and amps are use by some MSOs to block premium channels or boost signal respectively).

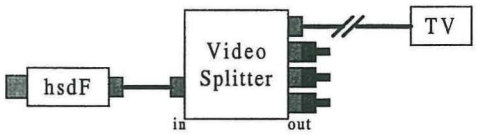

Figure 2.3 Video Distribution System

RESULTS

The self install test program was closed after 83 customers had selected this option, proceeded through the process as it was defined, and became regular paying MediaOne HSD customers. Of the 83 customers only one customer was unable to perform the tasks necessary to activate Internet service. The good news is that this person still proceeded through the fail-safes and later became a regular HSD customer. The results of the remaining customers who actually completed the self install and the survey are explained in detail below.

Survey Summary

Self installation of MediaOne Internet service was a positive experience for its test participants. Surprisingly the ease of the RF installation portion of the self install ranked very close to that of configuring the PC. Cable modem and browser configuration were the most problematic aspect of the self install.

A majority of the test participants completed the installation within two hours. While slightly more than half of the participants experienced technical difficulties during the installation, less than a third of those found it necessary to contact technical support.

The top reasons for electing a self installation of MediaOne Internet service were fast activation (i.e. participants did not have to wait for MediaOne to install the service) and cost savings (i.e. the installation was free AND participants were given $10 off service for the first three months). These reasons were consistent across the voluntary comments and stated importance ratings.

Participants in the test were highly involved in the PC category. A self assessment of skills revealed that participants had a high degree of comfort with opening a PC, installing a computer expansion card, and installing/configuring PC software.

Test participants tended to own multiple PCs, have at least a Pentium processor in their newest PC, and be employed in the PC industry. While all participants were male, their educational background and age varied.

Survey Conclusions

Self installation of MediaOne Internet service was a positive experience for test participants. Not surprisingly, these participants were highly involved in the PC category (e.g. PC industry occupation, multiple HH PCs, Pentium/Pentium II processors, extremely high comfort level with installing/configuring hardware/software on a PC). It is likely that the positive experience with self installation of MediaOne Internet service was directly related to the capability of the person completing the self installation.

General Conclusions

Advanced Authorization was used to set up the customer's account prior to their self install. This pre-activated Internet account enabled the service to be immediately used

once cabling and CPE configuration were completed. Field tests proved this was an effective method of leveraging existing practices to expand the number of ways to install HSD customers.

True "No-Truck" HSD installs are possible in a variety of cases depending on the skill of the customer and the type of dwelling. For example, an apartment can be one of the easiest wiring jobs and one that a majority of customers can accomplish. Likewise, a customer with technician skills often prefers to do the install himself.

Self install is viable and has a bright future. Currently about 5% of all installs could be self installs. Some ways to increase this in the future will be explained in proposed next steps section.

Selection of self install candidates is a key to being successful. Asking the right questions to ensure customer is comfortable is worth the time taken.
Motivation to get customers to try this method must be emphasized. Without it, candidates will select the path of least resistance. It also helps to portray like the program as well established with numerous successes.

CHALLENGES THAT REMAIN

For the average, below average, and beginning computer users the HSD installation represents a significant challenge. Although progress is being made towards simplifying this process, the following represent some of the most underestimated and unresolved issues remaining:

Software (Lack-of)

A common mis conception with regard to self activation is that HSD installs are as easy to install as other dial-up Internet service providers. This is true. MSOs provide a network rather than a dial-up connection. Dial-up connections have been around for years, there are several tried and true install applications that enable a dial-up ISP to configure a customer with a variety of telco-modems to connect to their service. These tried and true install applications do not exist for network cards which are the basis for MSO installs. Instead, MSOs must rely on manual configuration of this hardware, reducing the number individuals who can qualify (skill-wise) for self activation. A tried and true network configuration application suitable for use with HSD installs would be at least a one-year effort and would need to keep up with current network technologies and drivers. In other words, network installs will be more difficult than dial-up installs in the short term due to changes in network cards, drivers, and networking technologies. MSOs must demand network installation tools exist.

In-House Wiring

Most rooms used for residential or other Internet computing already have a telephone outlet. However, CATV jacks for access to HSD or having CATV mean HSD Ready is a problem with new houses being constructed. Building contractors and house designers must be aware of the in-house wiring requirements of a "proper" HSD system that will support TV, HSD, and telephony (i.e. quad-shielded RG6 cable). Until this is viewed and treated as a desirable feature in new homes (especially those that are totally finished out) installing HSD will always be more complex that activating dial-up services in the home.

Universal Hardware Support

MSO HSD also suffers from the lack of hardware support, this is common to personal computers already in homes as well as those currently sold. Since a majority (more than 90%) of all home computers do not include a

factory installed network card, the install must provide additional hardware and sometimes software to activate this type of Internet connectivity. The addition of this hardware is problematic as the average home owner does not feel comfortable opening up their personal computer and installing additional hardware. Dial-up customers do not face this problem nor do they face the problem of pre-qualifying a personal computer. Qualifying a personal computer is needed because not all computers can handle any additional hardware (slot or IRQ deficiency). The problem of universal hardware support cannot be solved in the foreseeable future. Only after *all* personal computers come *standard* with a built-in network card, USB, or 1394 (firewire bus) will an end point for universal hardware support be attainable. A workable predictor is 3 years after such time as *all* personal computers come standard with one of the items above. Only then will this problem become less of an issue. This is based on a 3 year ownership of a personal computer before it is desirable to upgrade.

Note as some MSOs offer customers support for multiple CPEs limitations in USB and Firewire functionality will limit these technologies from supporting more than a single CPE. As a result, use of USB/Firewire as a subscriber's only link to the cable modem can prevent additional CPEs from accessing the Internet. The ethernet interface (which requires a NIC) will be the only way a cable modem will support multiple CPEs to access the Internet without the use of some additional software.

Billing Issue

Activating the individual components of HSD service (i.e. CM and CPE) has been a relatively easy process because these devices easily provisioned. The hard part of self activation is associating this process with a billing system. The true *success* of a self service installation program should be based how well it performs the necessary checks and balances to qualify a customer financially and interface with the MSO's preferred billing system. A standard API is needed from MSO billing systems that is vendor independent. Without this API, completing any type of self activation without any MSO personnel intervention is *not* possible. This is why a phased approach must be taken to reach some level of self activation.

Summary

The phased approach enables additional installs without consuming valuable field technician time. Technicians can reserved for completing customer installs for people without the spare time or skills to do this themselves and maintain service for those experiencing problems. MSOs must overcome the challenges that they face to streamline existing install options and continue to expand in to new areas that fulfill customer needs. Because the base of customers who *qualify* for self install is limited, the best option for expanding the number of working MSO HSD customers is to provide many different ways for them to get activated (cater installation options to the skills and needs of our customers).

PROPOSED NEXT STEPS

Need a Strategy

As MSOs continually move in the direction of less employee involved installs (more automation) they will become much more reliant on technology to interact with their customers. An often overlooked fact with regard to self service activation is that it is a MSO's first crack at a new customer and thus familiarizes them with an interface that they can later use for other purposes -- say account maintenance. Therefore, MSOs must look at self service as a way provide things

such as brand name reinforcement, cross selling, even advertising!

MSOs that don't capitalize on this initial contact with customer (i.e. offer them ALL their services up front and provide customers comprehensive support, co-branded services, as well as special offers [incentives] to continue to return to this interface) will loose out on a gold mine of opportunity. Thus it is critical that each MSO have a self service strategy in place before driving down the road of selecting a vendor or particular application and getting some kind of self service in place and operational. Self service should involve all areas of the business (i.e. video, pay-per-view, HSD, telephony, marketing, customer care, operations, etc) to ensure adequate planning and that the product the MSO will receive will meet *all* the needs of the business.

Develop Models

A recent survey of several MSO regions could not produce a model for how they propose to install and support various broadband services (such as HSD, telephony, Digital TV, On-Demand Video, etc) together via a single customer drop.

The absence of a model allows for variation in the way each MSO as well as each MSO region supports the same broadband service. However, if a model was adopted by the company and all its RF experts in the regions, there would be fewer (if any) variations in the way various services are deployed, installed, and supported. Standardization would be easier and there would be less work involved in deploying new services if the model was followed and there was no need to customize the service to work within various non-standard regions.

This model for all services could be as simple as a diagram showing how each service will connect to a single customer drop. However, a much better model would be one that went into detail on some of the combinations in the field (apartments, duplexes, homes, commercial, etc). In most MSOs, the way each of these dwelling types is wired varies from region to region and even within a region (because regions usually consist of several smaller cable companies that have merged). Once the model is created the next hurdle is to enforce them. This may mean that a 5 minute service call becomes a 45 minute rewire. However, these efforts to achieve some degree of standardization to a model will pay big dividends in the future as more services are bundled and actually dependent on particular wiring practices (e.g. HSD and telephony). The model should also allow for hybrid wiring (e.g. category 5 and quad shielded RG6). This will provide customers the ability to choose how certain services are installed (perhaps the cable modem is installed in the basement and category 5 is run from there to an outlet). In this instance, customers could then connect MSO products to their existing in-home service (i.e. home LAN).

A model should be a public document and shared with building contractors and inspectors to ensure that standards set by the cable company are followed or at least deficiencies pointed out during an inspection so customers are made aware that their home does not meet the cable company's wiring requirements.

One suggestion that was emerged from the self install field study was the idea of an "HSD Ready Model". The idea here is provide support for HSD in everything an MSO does. If every house was wired for HSD then self install would be supported and thus the home would not require additional service calls to activate certain services. To achieve the suggested HSD ready "status" an MSO could do the following:

- On each service call, ask the customer if they have a computer and would consider getting connected to the Internet via their cable line some time in the future (if not already). If so, the technician offers to wire an additional outlet for free. If the customer accepts the offer, the customer's CATV account is flagged as "HSD Ready" and that customer could now receive literature about Internet service in their cable bill.
- New installs could also provide the same service in offering customers an additional outlet that would be HSD Ready.

Many different field organizations within an MSO could be offering customers an HSD ready AO. MSOs could achieve an increasing number of dwellings that are HSD ready. Over several years of this long term initiative, most of the dwellings would be HSD ready and therefore significantly reduce the average time for an MSO to perform a "traditional" HSD install at that location. Cutting down this time as well as allowing more customers to self install opens up many more install options for prospective HSD customers.

Partner with CPE providers

As more homes become HSD ready (similar to homes that already have a telephone outlet in their home office) it is unrealistic that an MSO will be able to provide in-home support for all its customer's CPEs. Between installation and service calls there is too much demand for MSO field organizations to handle the numbers of service requests. Phone troubleshooting, on-line FAQ, etc. will filter much of the calls but as subscribers increase MSOs will not be able to maintain sufficient numbers of technicians to provide this level of support. Therefore, MSOs must partner with service providers that are more capable of providing this service (emphasis on several providers).

The use of CPE service providers would help MSOs focus on maintaining its broadband network without having to keep up with the number of technicians to cover all installs and service calls. Note that as the number of installed customers increase, the number of installs will gradually decline. Since CPE service will be irregular it will be difficult for an MSO to maintain full time skilled technicians to cover this unpredictable work load.

Seek Out Cable Modem Service Providers

MSOs should be seeking out local providers that intend to carry DOCSIS cable modems and ensure that service on the cable modems and installation guides (or installation kits) are made available to people depending on which MSO provides the customer with CATV.

Service partners can offset some trouble calls especially if the customer purchased a cable modem from a particular retailer. In this case, some of these customer problems may go directly to the retailer rather than the MSO. In fact, the MSO should provide some basic level troubleshooting to the customer to make this determination: MSO (provisioning/network problem) or retailer (bad cable modem).