Overview
The Broadband Forum’s TR-069 suite of protocols allows for the remote management of home networks and greatly reduces the costs associated with broadband service activation and support. Under TR-069, the concept of data models is defined by specifying the baseline object structure required and a set of TR-069 accessible parameters that are applicable to all TR-069 enabled devices. This allows vendors to expose certain device functionality, such as a voice service configuration, or device information (internal log files, for example).

However, in reality, implementation of TR-069 is not always uniform. Even though the standard defines data models in a certain way, it is still possible for two devices implementing the same data model to behave differently. This may be due to differences in how the vendors interpret the standard, or simply a bug in the firmware. To address this issue, Incognito Auto Configuration Server has introduced the concept of Device Models.

By matching a device to its appropriate model, the Incognito Auto Configuration Server acts as a one-stop configuration for device-type and firmware-specific functionality. Auto Configuration Server comes preconfigured with a set of device models and supports the creation of models from a discovered device.

The ACS Device Model feature allows you to:
- Manage device-type and firmware-specific behaviors
- Simplify and enhance device diagnostic functionality
- Reduce database size and simplify provisioning

Each of these benefits is outlined in further detail below.

Manage Device Type or Firmware Specific Behaviors
The TR-069 standard defines several options for device functionality when communicating with an auto configuration server. However, in the real world, it is not unusual for devices to exhibit different interpretations of the standard and occasionally have faulty firmware. New firmware versions for the same device may also introduce new functionality or restrict old functionality, which again will account for differences between devices.

To overcome this problem, the Incognito Auto Configuration Server Device Model feature matches a device to its appropriate model during the device discovery process based on the device’s identifier and its firmware version. Each device model contains a set of options that influences the way the Auto Configuration Server communicates with the device, such as how the device will be discovered, and a set of device-specific functionalities, for example, the supported diagnostic operations.
Real World Example

A vendor releases a firmware update for a CPE that introduces new diagnostic capabilities on the device. This update adds “traceroute” in addition to “ping diagnostic”. At the same time, the vendor, due to device firmware limitations or errors, introduces a particular behavior with the implementation of the “getParameterValue” remote procedure call, which prevents the call from succeeding and renders the device unresponsive.

This scenario presents no problem for Incognito Auto Configuration Server. A new device model is created for the new firmware and this exposes the new diagnostic functionality. The discovery algorithm is adjusted to read the device parameters in small batches instead of all at once.

The Auto Configuration Server firmware update call will attach the new device model to the device. This ensures operational integrity despite the firmware bug, while automatically exposing the new diagnostic functionality to the operator after the firmware upgrade.

Simplify and Enhance Device Diagnostics Functionality

Under TR-069, the auto configuration server performs configuration and diagnostics by setting and retrieving the value of device parameters. These parameters are organized in a hierarchical structure that is more or less common to all devices and manufacturers.

The problem is that this process, as defined in TR-069, is cumbersome, error-prone, and complex. It requires the user to possess a large amount of assumed knowledge, including which TR-069 parameters to set for a certain diagnostic function, which parameters to start the process, and how to create a set-parameter-value operation for those parameters. The operator must then wait for the operation to complete, know which parameters hold the diagnostics result, and create a get-parameter-value operation to fetch these parameters.

Incognito simplifies this process with the Device Model feature. The Incognito Auto Configuration Server matches the device to the particular device model and collects all of the information required to perform a diagnostic operation before the operation is triggered. The user simply waits for this operation to complete and can access the results through a convenient web interface. As a result, the previously complicated device diagnostics procedure is reduced to three simple steps:

1. Select the available diagnostic operation from a drop-down menu
2. Fill in the necessary form fields
3. Wait for the operation to complete

Reduce Database Size and Simplify Provisioning

A TR-069 enabled device may expose over a thousand parameters at any one time, with only a small subset relevant for day-to-day operations. Reducing the number of exposed parameters to only those that are of operational interest simplifies the provisioning and diagnostic workflow for operators.

The Incognito Auto Configuration Server Device Model feature allows operators to limit the number of exposed device parameters to only those that have business value. This means that databases sizes can be greatly reduced, often by as much as one order of magnitude.

Reducing the size of the database reduces room for human error. It also improves system efficiency during search and provisioning operations, allowing Auto Configuration Server to act as a fast and reliable device provisioning and management system.
The Incognito advantage

The Device Model feature greatly simplifies device diagnostics, provisioning, and management. This feature matches a particular device to its device model and allows the device to communicate with Incognito Auto Configuration Server no matter the device type or firmware version. This feature automates the device diagnostics process and simplifies provisioning by significantly reducing the size of the database. This also ensures that Auto Configuration Server runs efficiently to remain fast and agile.

Auto Configuration Server is an end-to-end device management solution based on the Broadband Forum TR-069 CPE WAN Management Protocol. It offers secure and reliable network-agnostic provisioning across a wide range of access networks including xDSI, PON, WiMAX and cable systems, and supports nearly every TR-069 device on the market.

To learn more about our DHCP and device provisioning software, please visit: