



Leveraging Business Logic to Improve Operations and Enhance Productivity

Contents

Introduction	3
Implementing Business Logics Via Automated Scripts	3
Taking Advantage of Business Logic	4
Balancing Built-In Automation and Specialized Business Logic	4
A Best-of-Both Worlds' Management Solution from Motorola	5
Representative Use Cases of Managed Scripts	7
<i>Device Replacement</i>	7
<i>New Service Introduction</i>	8
<i>Normalizing Authentication</i>	8
<i>VoIP Configuration</i>	8
<i>Intelligent Setting of CPE Parameters</i>	8
Summary	9

Figures

Figure 1: Special purpose EMS systems require no scripting.	3
Figure 2: General-purpose device managers require scripting capability.....	4
Figure 3: EDGE Manager offers a layered architecture that enables swift delivery of managed scripts that implement business logic to improve operations.....	5
Figure 4: During the development phase, the EDGE Manager scripts can be customized to suit the operator's environment and business model.	6
Figure 5: EDGE Manager offers a powerful architecture that integrates video and other broadband services with devices deployed on the customer premises.....	7

EDGE™ Manager's Business Logic Advantage — A customizable engine for enabling complex configurations and ad hoc customization through automated programming

Introduction

Automation of network monitoring and remote device and services management is central to the ability of carriers and cable operators to accelerate the delivery of the personal media experience to the digital home customer. Automation allows network operators to lower operational costs and minimize truck rolls while improving customer satisfaction through a richer, more satisfying experience. But automation is not a one-size fits all solution; each operator environment is unique. There is variability in service packages, in networks, in standards, and in the myriad vendor devices deployed in the field.

What is needed is a system intelligent enough to fully exploit the benefits that can be achieved through automation and flexible enough to deal with this inevitable variability. Motorola's EDGE Manager Remote Management Software Platform is a remote management solution that enables network operators to remotely manage the full lifecycle of service rollouts and ongoing service and device management.

The EDGE Manager's field-customizable business logic engine, which enables automated scripting capabilities to allow carriers and cable operators to effectively and simply address variability and ad hoc needs, is unique. EDGE Manager's policy-based business logic consistently ensures a high-quality personalized media experience for subscribers. This whitepaper discusses the advantages service providers can gain by the use of the EDGE Manager business logic engine and presents several use cases that highlight the business advantages service providers can gain from this unique EDGE Manager feature.

Implementing Business Logics Via Automated Scripts

Large-scale, effective device management is a challenging and sometimes elusive endeavor. The population and types of devices in the field that require management are constantly changing and ever increasing. Couple that with the need to support legacy systems and processes, and it becomes clear that the device management system selected for the task must not only be scalable, but also very flexible and adaptive.

The business reality is that no carrier or cable operator can afford to deploy multiple element management systems (EMS) to manage devices and enable new services. The ability to abstract device capabilities and develop automated scripts to implement business logic across multiple device types is crucial for achieving economies of scale in managing subscribers and services. A key attribute of such a system is the ability to change its standard behavior to adjust for variability, and to be able to do so on demand. This enables the management system to adapt to changing business goals and to grow with the needs of the organization.

The more of these connection points there are, and the more inflexible they are, the greater the need for a management system with built-in scripting and business logic capabilities. This applies to both the northbound connections of the operational support systems (OSS) as well as the southbound connections to the devices at the subscriber locations. An EMS manages dozens of devices and has many touch points, while EDGE Manager is scalable and manages millions of devices with higher-level touch points. Device management systems have many integration points in the provider's network. For example, a special-purpose EMS that manages a limited number of well-defined devices with well-defined capabilities does not usually require scripting. The "canned" functionality built into the system is adequate, and there is little need for deviation from its behavior.

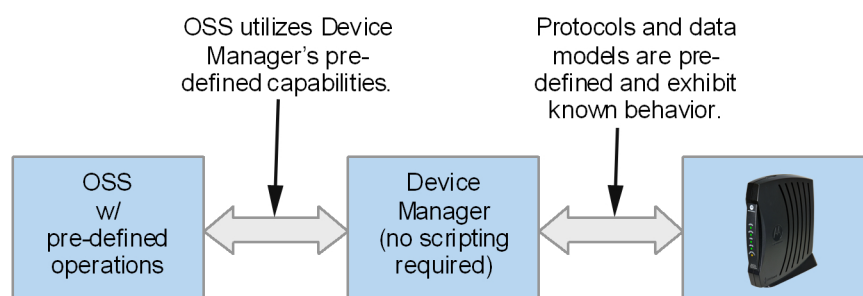


Figure 1: Special purpose EMS systems require no scripting.

On the other hand, a general-purpose management system with connections to various different kinds of devices and upstream systems requires some amount of scripting capabilities to mitigate unforeseen behaviors and ensure its usefulness and adaptability into the OSS environment.

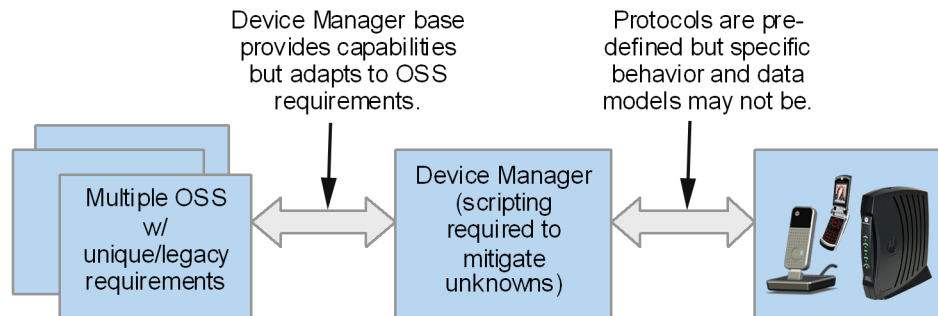


Figure 2: General-purpose device managers require scripting capability.

Taking Advantage of Business Logic

Scripting provides the ability to add complex business logic to the device manager layer, where it can be optimized to provide dramatic efficiencies. By shifting common, highly-utilized business logic to the remote device and services manager, unnecessary overhead and development efforts on the OSS can be avoided. This results in significant savings in infrastructure costs as well as major improvements in performance, time-to-market, stability, and maintainability of the overall solution.

Device management can then be broken down into a set of common, well-defined operations — which are both meaningful and appropriate — regardless of the device type. Network operators can centrally develop scripts that implement business logic to support important operational activities, such as:

- Provisioning – Defining the device and the subscriber to the system.
- Activation and Deactivation — Configuring the device with selected subscriber settings and taking a device or subscriber out of service.
- Problem Diagnostics and Resolution — Querying the device and making provisional changes to diagnose and resolve problems.
- Monitoring and Reporting — Gathering statistics for long-term problem resolution and trending.
- Bulk Operations and Maintenance — Maintaining the configuration and enforcing policies over time as changes in service occur (i.e. hardware swap, service change, etc.).
- Logging and Alarming — Interpreting events and stored data to create alarms unique to the operator’s environment.

The ability to script and modify system behavior is essential for automating each of the above operations. Having the ability to insert or modify scripts at every level of these operations provides a workable and sustainable level of adaptability, allowing service providers to:

- Meet the requirement of the business with a moderate amount of effort and investment.
- Establish a controlled and extensible environment for making changes and enhancements that will support additional devices and services.
- Swiftly provision new services and allow new device types to benefit from business logic according to policies defined by the organization.

Balancing Built-In Automation and Specialized Business Logic

EDGE Manager strikes the right balance between the built-in functionality and the points at which scripting is allowed. This is the key value-add that a flexible management system must offer. Without it, developers and operations staff are left with no guidance and structure, resulting in extensive learning curves for the development staff and prolonged development cycles.

When considering the implementation of a large-scale device management system into an existing OSS infrastructure, it is rarely the case that the system does not require some modification to meet initial and ongoing requirements. Having a system that, once integrated, enables modifications in a controlled, standards-based, yet flexible, way plays an important role in minimizing the overall complexity and cost of an automation project throughout the lifecycle of the device or service. A balanced system with built-in functionality and smart customization points provides the following benefits:

- **Reduced Cost of Automation** — Scripts are developed and deployed faster, and common logic is applied to a larger set of devices.
- **Increased Operational Efficiency** — Enhancing a single system that is the central conduit to the devices is much more efficient than adapting multiple EMS platforms. When a change is made centrally, all the OSS systems benefit and are automatically updated.
- **Ongoing Operational Flexibility** — Accommodating script-based changes to device sub-populations throughout their lifecycle without timely and expensive OSS retooling.
- **Improved Customer Care** — Better tools can be provided to the customer care agents to improve their efficiency and productivity.
- **Increased Network Performance** — Eliminating unnecessary communications between multiple device managers and upstream systems that detract from performance and introduce instability will result in better system performance.
- **Accelerated Delivery of New Services** — CPE from multiple vendors can be automatically updated system wide to support new services.
- **Better ROI** — Inflexible, device-specific element management systems provide a quick return on investment in the initial installations but tend to diminish in usefulness over time as the needs of the business change. The ability to leverage a centralized platform for managing devices and services allows network operators to more efficiently and more effectively manage diverse network elements according to business policies.

A Best-of-Both Worlds’ Management Solution from Motorola

The Motorola EDGE Manager device management software platform is a flexible and scalable device management system that has been architected to enable flexible, JavaScript business logic. It works with any protocol and any domain, and it supports all common device management interfaces—including TR-069, OMA-DM, SNMP, CLI, and HTTP-based web interfaces—for the ultimate in access to a range of devices for service provisioning, management, and support. This broad support for multiple interfaces allows EDGE Manager to manage the widest variety of third-party IP-enabled devices. Using this approach, the EDGE Manager can perform the following functions:

- Individual or en masse updates to device software and configurations.
- Configuration and management of advanced services.
- Real-time CPE monitoring and troubleshooting.
- Provisioning, monitoring, and analysis.

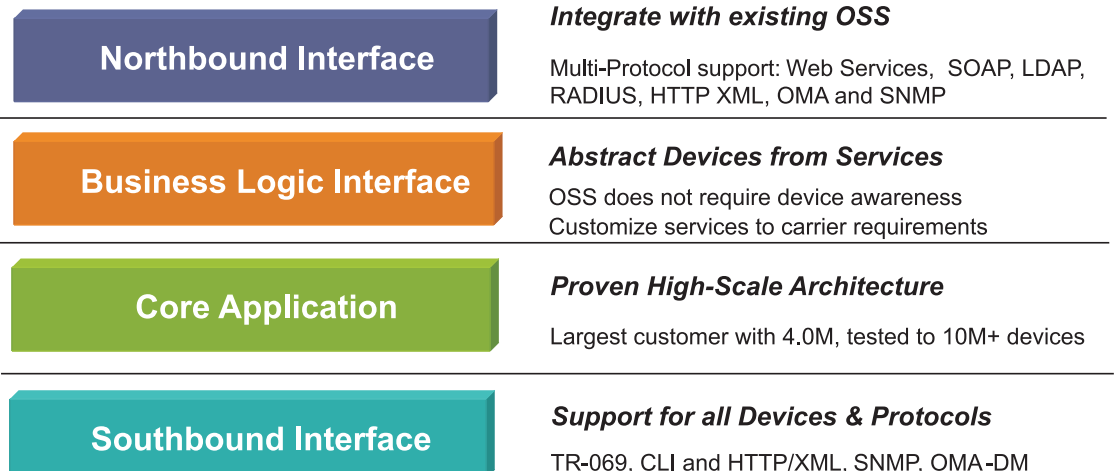


Figure 3: EDGE Manager offers a layered architecture that enables swift delivery of managed scripts that implement business logic to improve operations.

EDGE Manager is the world's leading TR-069 management system. It manages more of the world's installed CPE than any other management system. It enables consistent policy management across multiple CPE platforms from multiple vendors and allows service providers to develop and run scripts to automate standard processes. The EDGE Manager device management system helps Motorola deliver fully-integrated and customizable media solutions for a personalized, rich media experience direct to the consumer. It enables service providers to deliver revenue-generating applications and solutions. Support for managed scripts on the EDGE Manager Platform allows service providers to develop scripts that encapsulate virtually any type of knowledge to be uploaded to the EDGE Manager and run to affect a single device or an entire service area.

EDGE Manager offers out-of-the-box scripts for automating standard business processes and provides the tools that allow network operators to swiftly develop scripts that reflect organizational policies and procedures. Support for business logic is inherent in the architectural design of EDGE Manager, and service providers can create new scripts or customize existing scripts through the use of the standards-based JavaScript programming language.

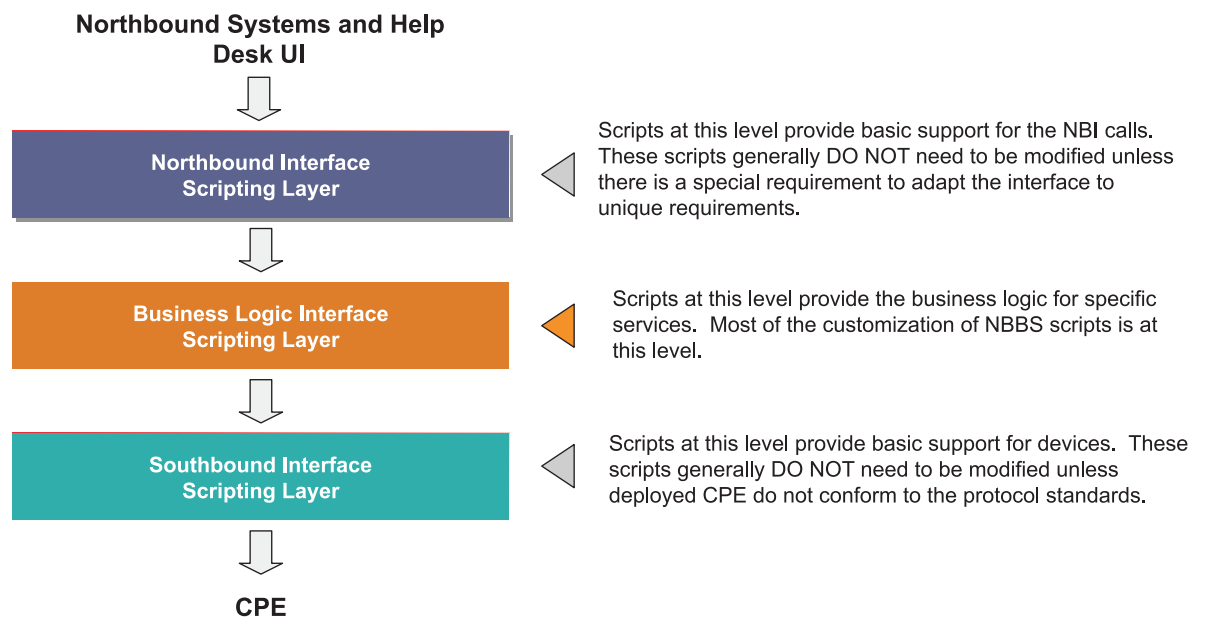


Figure 4: During the development phase, the EDGE Manager scripts can be customized to suit the operator's environment and business model.

Service providers need the ability to deploy and monitor devices, networks, and services while resolving issues and delivering service-aware application support. The Motorola EDGE Manager platform delivers flexible support for IP services that allows network operators to centrally monitor and manage service delivery so they can build closer and longer-lasting bonds with residential subscribers, and the EDGE Manager Business Logic Engine automates processes to make device replacement painless, allowing service providers to drive down OpEx and streamline operations.

It enables zero-touch provisioning, simplifying the delivery of new services, reducing the frequency of customer service calls, and making subscribers as self-sufficient as possible. The estimated average cost of a customer service call is \$10 while the estimated average cost of an online web inquiry is only \$2, so allowing customers to be extremely self-sufficient is a major economic advantage. EDGE Manager allows network operators to fully automate upgrades of new and replacement consumer premises equipment, enabling automatic portability of business logic from one device to another.

The platform provides seamless integration into existing provisioning, billing, and operational OSS applications, and it delivers powerful device management of configurable devices at the network edge. EDGE Manager enables an excellent end-user experience and allows the network operator to effectively implement video service assurance and scalable device management capabilities that allow network operators to manage millions of devices with automated tasks and service provider-specific business logic.

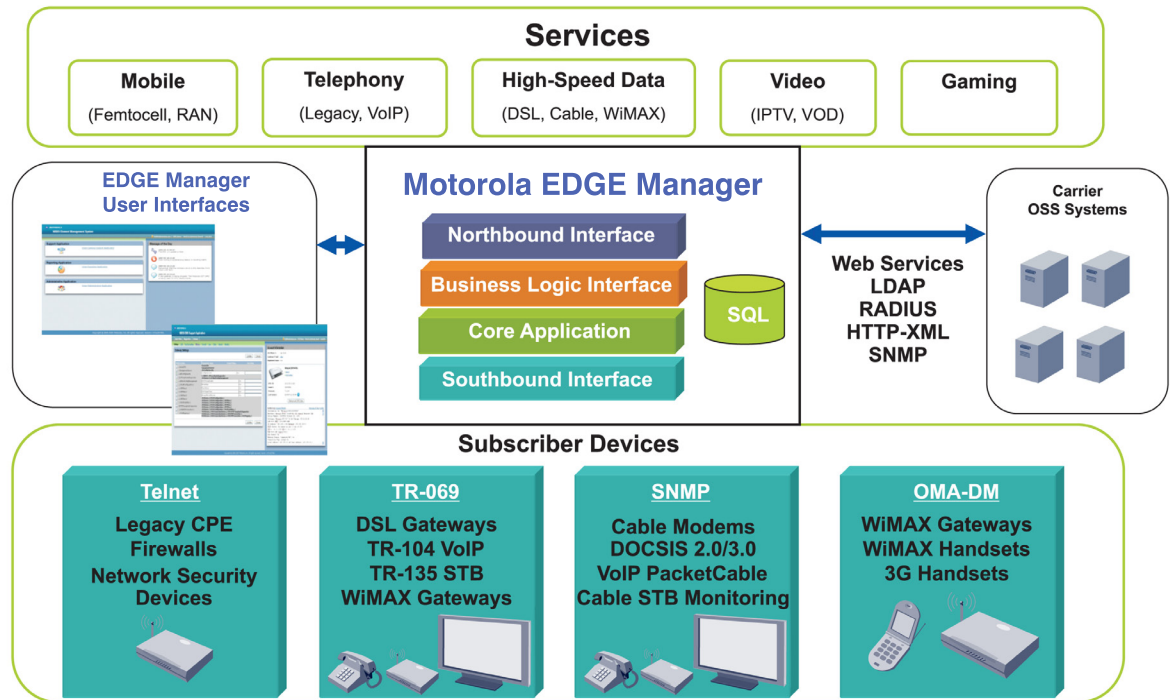


Figure 5: EDGE Manager offers a powerful architecture that integrates video and other broadband services with devices deployed on the customer premises.

EDGE Manager supports all the popular standards-based device management interfaces. Additionally, EDGE Manager provides HTTP-based northbound Web interfaces to backend systems for service provisioning, management, and support.

EDGE Manager offers far more capabilities than a traditional automatic configuration server (ACS) platform. It serves as a business logic platform that can be customized by region, CPE type, or service. Most CPE devices conform to industry standards, but many of these platforms include proprietary, device-specific characteristics that must be addressed. Scripting and device abstraction in EDGE Manager provide the critical building blocks needed by service providers to adapt the system to their unique environments. Motorola has placed the power to encapsulate business logic and organizational knowledge into the hands of service providers, and the scripts can be either internally developed or written by experienced Motorola professional services engineers.

Representative Use Cases of Managed Scripts

EDGE Manager allows network operators to automate complex configurations of a sequence of actions to be performed centrally via a single click. It expands ACS functionality beyond the basics of device management, and it supports automated batch updating and monitoring of a large number of devices for diagnostics, troubleshooting, issue resolution, and upgrades. The following are a few real-world examples of how carriers and cable operators are implementing managed scripts to improve operations:

Device Replacement

Swapping out CPE for a subscriber typically requires manual intervention by customer support agents to update the existing data record with the new device information before re-activating services. This process has been automated in EDGE Manager through the use of scripting. The script replicates the manual procedure and does in seconds what previously took minutes and tied up valuable technical support resources. The script works by locating the old customer record in the database and applying the existing settings to the newly-swapped device. The script automatically handles any of the discrepancies between the old and the new devices, such as if the new device is a more recent model. This script streamlines device replacement, automating what would otherwise be a labor-intensive process that might be implemented hundreds or even thousands of times each day by a service provider.

New Service Introduction

New product introductions typically result in any number of CPE configuration conflicts that can degrade or inhibit the performance of the new and/or the existing services. Multiple CPE configurations are typically deployed to accommodate service provider-specific needs, and the resulting variants can make it almost impossible to manually regression test new services against all possible scenarios. EDGE Manager scripting has been used to selectively deploy modifications that overcome these conflicts. The intelligent deployment of variant-specific patches on an automated basis saves manual resources and enables rapid response to potential problems before they impact subscribers.

Normalizing Authentication

CPE manufacturers often use proprietary authentication methods for their devices, often leading to complex support issues. The various authentication methods create an on-going maintenance burden on the device manager. Sometimes the complexity of handling the various methods forces operators to bypass authentication altogether, creating a security exposure. In this case, an EDGE Manager script handles the authentication policy for different types of CPE, and the business logic captured in the script can be modified or extended to support new devices. The script enables different policies to be applied to different equipment makes and models, and service providers retain the flexibility to apply different policies based on whether the device is new or pre-existing. An EDGE Manager script can therefore handle the authentication policy for different types of CPE, allowing the service provider to future-proof device management through the use of business logic.

VoIP Configuration

A network operator deploying a voice-over-IP (VoIP) service shipped CPE with a default configuration of firmware that allowed up to 10 phone lines to be provisioned for each customer. The CPE tried to connect to the session initiation protocol (SIP) server to register each of the 10 possible lines, while the operator was offering a maximum option of three phone lines. This resulted in unnecessary calls to the SIP servers, congesting network, and degrading phone service. EDGE Manager scripting was used to reset the URL for the SIP servers for the unconfigured lines, preventing excessive and unnecessary calls for registration from each deployed CPE device.

Intelligent Setting of CPE Parameters

Service providers can create scripts to address diverse CPE issues. For example:

- One service provider deployed CPE platforms with default settings set to inform the central office of its status at 2:00 each morning, leading to an excess of traffic that was overloading the network. EDGE Manager scripting capabilities were used to implement and reschedule the CPE inform time periods to stagger the load throughout the day.
- A network operator deploying voice service faced a CPE memory leak that was causing network disruption and customer dissatisfaction. After a month of uptime, the device no longer supported phone calls and needed to be rebooted. Motorola created a script to check the uptime of deployed devices. When the uptime of these devices reaches one month, they are automatically rebooted.
- Another service provider relied on an EDGE Manager script to address an echo cancellation issue in a VoIP service. A certain combination of settings (such as turning off call waiting services) would disable echo cancellation, leading to degraded voice calls. Motorola created an EDGE Manager script that actively looks for problem configurations and re-enables echo cancellation, thereby avoiding dissatisfied customers and burdens on the call center.
- A carrier deployed a router that used a combination of standard TR-069 settings and speed touch script (STP) settings, but if TR-069 and STP settings were not set in the proper sequence, the CPE would receive an invalid parameter error and lose functionality. An EDGE Manager script was created to autoconfigure the session and the sequence of settings for TR-069 parameters and STS file downloading, ensuring that the STS configuration is correct before downloading the TR-069 parameters.

Summary

The ability to automate business logic can be a crucial advantage to service providers, providing them with the ability to offer differentiated service packages and superior customer satisfaction. With EDGE Manager Remote Management Software Platform, service providers get a central automated platform with both comprehensive, built-in functionality and the ability to centrally create scripts that are implemented on any number of remote CPE devices to automate the delivery and maintenance of broadband video, data, and voice services.

EDGE Manager provides an industry-leading level of home network monitoring and management. It has already been deployed by over 20 network operators and is currently used to monitor and manage millions of CPE devices worldwide. It allows network operators to monitor and manage the delivery of IP services throughout the connected home, providing operational support staff with holistic home network visibility into IP devices connected to the home network.

EDGE Manager enables the concurrent presentation of gateway and set-top data, delivering an integrated view of the subscriber's managed devices that enables more rapid trouble isolation and control. Network operators can leverage the organization's existing JavaScript programming expertise to swiftly develop and deploy powerful scripts that implement business logic on remote CPE devices. Motorola provides the products, systems, and professional services that enable efficient and reliable visibility and automated management of the connected home.

Carriers and cable operators can swiftly develop and deploy business logic through the use of Java-based scripts, and they can streamline operations, improve customer care, and deliver enhanced services. For more information about EDGE Manager, please visit www.motorola.com or contact your Motorola account representative.



MOTOROLA

Motorola Mobility, Inc., www.motorola.com

MOTOROLA and the Stylized M Logo are trademarks or registered trademarks of Motorola Trademark Holdings, LLC. All other product or service names are the property of their respective owners. ©2010 Motorola Mobility, Inc. All rights reserved.

365-095-16526 x.1 12/10