

Frequently Asked Questions

mProve General FAQ

October 10, 2008



General Questions

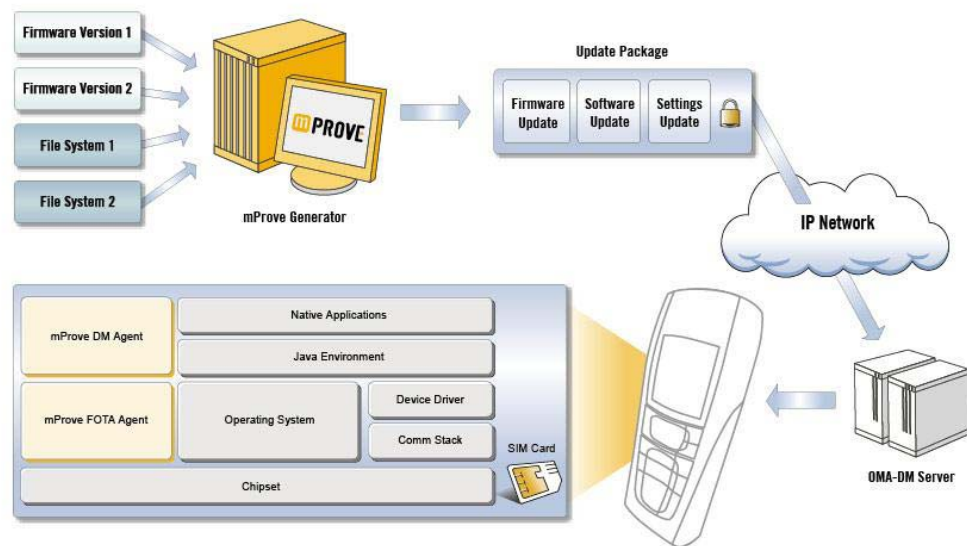
Q: What is HP mProve?

A: HP's award winning & patented mProve solution is a comprehensive client-side software suite, designed to be embedded in a mobile device to enable over-the-air device management using a standards-based protocol known as OMA DM or Open Mobile Alliance Device Management. mProve enables a wireless operator or service provider to perform firmware updates, remote diagnostics and monitoring, configure device settings, etc. HP mProve consists of two components:

- **mProve FOTA.** mProve firmware over-the-air (FOTA) provides an end-to-end solution for firmware over-the-air updates. The software suite consists of two components:

mProve FOTA Generator. A PC-based application that compares two firmware or software images and creates an Update Package. The Update Package is comprised of a set of data and instructions to build the target image.

mProve FOTA Agent. The software agent resides on the device and contains the algorithms to decrypt, validate, and process an incoming Update Package. It interprets the instructions to re-flash the firmware or software component on the device in a secure, fault-tolerant manner.



- **mProve Device Management (DM).** This client software resides on the mobile device and handles communication with an OMA standards-based server for device management. It supports these industry standards:
 - OMA DM (both versions 1.1.2 and 1.2)
 - Firmware Update Management Objects (FUMO v1.0)
 - OMA Download (DL) specifications (OMA DL v1.0)

The HP mProve DM software development kit (SDK) includes utilities such as a tree wizard to automate the generation of wrapper files to easily customize and meet operator requirements. This solution leverages HP's unique domain of expertise to support upcoming specifications such as DiagMon (Diagnostics and Monitoring software), SCOMO (Software Component Management Object), etc.

Q: What is OMA? What is OMA DM?

A: The Open Mobile Alliance or OMA is an industry standards organization, formed in June 2002, whose purpose is to develop wireless standards and specifications for mobile devices. OMA Device Management (DM) is a working group within OMA whose goal is to specify protocols and mechanisms for the management of mobile devices. The mProve solution uses the OMA DM protocol to communicate with any OMA DM-based server solution.

Q: Is mProve available for customers today?

A: Yes, mProve 6.3 is available for installation and use.

Q: Who is using mProve today?

A: HP's award-winning and patented mProve solution is the most widely-used FOTA solution in the world with millions of devices deployed and in use worldwide. HP's patented and market-leading technology, market position, and continued focus have resulted in global agreements with over 25 leading OEMs. mProve's customer list includes Nokia, Motorola, Samsung, LG Electronics, Sony Ericsson, Kyocera, UTStarcom, TCL Mobile Communications, Amoi Electronics, Cellon International, BIRD, and others.

Q: What is the typical customer profile of an mProve customer?

A: The target customers for the mProve software solution are an ODM and/or OEM who needs to manage their devices over the air. Key requirements are:

- Enable firmware updates (i.e. FOTA) on devices
- Support the OMA DM mobile standard
- Comply with an operator or service provider's MDM requirements
- Include an end-to-end DM solution into their own offering

Q: Can mProve work in other devices besides mobile phones?

A: Yes, mProve can work outside the mobile phone domain. In fact, mProve has been licensed by leading telematics, also known as Machine-to-machine (M2M) providers, such as Enfora to integrate the solution into their onboard telematics solution. Also, mProve has been licensed by a point-of-sale (POS) provider to upgrade its POS devices over the air. mProve is not dependent on cellular and can update non-cellular devices over WiFi, Bluetooth, etc.

Q: Can I purchase the mProve DM client and not the mProve FOTA client or vice versa?

A: Yes, the mProve solution is architected in a modular fashion allowing for maximum flexibility. Therefore, a customer may purchase only the mProve DM or FOTA agent individually or bundle them together.

Q: How is mProve different from application platforms such as BREW, Java, etc.??

A: An application platform such as Qualcomm's BREW, operates above the operating system, and therefore is limited to downloading and updating only those applications that operate above the

platform. mProve can update any software component within the device, down to the metal, including updating the mProve client itself.

Q: What is the business model?

A: mProve is sold using a traditional software royalty model. The model includes a one-time fee for the mProve Generator and a volume-based per device royalty for the mProve FOTA & DM agents. Also, there is an annual software support and maintenance fee. Professional services assistance is typically required for the initial integration and is based upon an agreed upon SOW between HP and the customer.

Q: Do you have any intellectual property in this area?

A: HP is the pioneer and patent holder of device management technology for mobile phones, used by the largest device manufacturers and operators worldwide. HP has a comprehensive intellectual property portfolio in this domain to complement its market traction and technology. Its intellectual property portfolio includes 6 granted patents (U.S. Patent Nos. 6,832,373; 6,941,453; 6,785,707; 6,941,453; 6,978,453 and Korean Patent No. 0506785) relating to FOTA and related device management technologies with over 125 patents pending.

Q: Why should a customer choose HP mProve vs. the competition?

A: There are several reasons such as:

- **Market Share.** HP mProve has over 25 global OEM agreements worldwide and millions of mProve-enabled devices shipping worldwide.
- **End-to-End Solution.** HP provides both the client and server-side software components allowing you to deal with a single source for your E2E device management solution.
- **Experience.** HP's development team has completed integrations on over 70 device platforms and provides a unique client/server skill set.
- **Stability & Maintainability.** The comfort of knowing a world-class organization such as HP is supporting your organization with best-in-class products and services. The other vendors are small venture-capital funded entities with short operating histories.
- **Ease of Integration.** Modular & versatile architecture/APIs (i.e. SDK) empowers OEMs to easily integrate the solution on their devices and extend it to support new use cases such as provisioning, diagnostics, etc. and to adapt to fast-moving standards.
- **Intellectual Property.** HP has a comprehensive intellectual property portfolio to complement its market traction and technology. Its intellectual property portfolio includes 6 granted patents (U.S. Patent Nos. 6,832,373; 6,941,453; 6,785,707; 6,941,453; 6,978,453 and Korean Patent No. 0506785) relating to FOTA and associated DM technologies with over 125 patents pending.

Technical Questions

Q: What are the key capabilities/product features of mProve FOTA?

A: The mProve FOTA solution is used to compare two firmware images or file systems and create a differencing file, or Update Package, that converts an old image into a new image. The Update Package is comprised of a set of data and instructions for transforming the software image from source version to the intended target version. mProve has been developed to address a wide range of architectures and complex use cases such as the update of compressed firmware images, open file systems such as Symbian, Microsoft, or Linux, and the update of individual software applications.

Below is an overview of the main features of the mProve FOTA solution.

- Highly competitive performance. Advanced compression algorithm minimizes download bandwidth requirements, download time, and device memory requirements.
- Platform Agnostic. Can be used to update the core firmware, embedded applications, or software components in a modular process that is transparent to the rest of the software system enabling you to address various update use cases and complex architectures such as Linux, Symbian, or Windows OS.
- Compressed Image & File Support. Algorithms handle compressed software images used with NAND flash memory devices, and open OS applications, and downloadable software components.
- Low RAM Requirement. Enables devices with limited RAM to be updated efficiently.
- 100% Fault Tolerant. Update process can recover from interruptions such as power loss, network failure, or unpredictable user behavior with complete fault tolerance. Once power is restored, mProve continues from where it left off.
- Detailed Statistics. The Generator produces detailed statistics with each generation process, such as number of write unit erases/writes, memory allocation, etc., offering useful information to estimate performance results on a targeted device.
- Self-Updating Agent. Update Agent can update itself along with the firmware image in NAND or NOR implementations offering a future-proof solution for FOTA by allowing new versions to be deployed in the field.
- Rapid Integration. Offers an easy integration methodology to support both proprietary and open OS mobile devices (smart phones) using a single integration point.

Q: What are the key capabilities/product features of mProve DM?

A: mProve DM is a comprehensive standards-based solution that enables the configuration and management, event-driven profiling, diagnostics, and robust firmware and software management of mobile devices. The client supports the OMA Device Management (DM), Firmware Update Management Objects (FUMO), Device Synchronization (DS), and Download (DL) specifications for managing the mobile experience. In addition, the solution leverages HP's unique end-to-end domain expertise to support upcoming specifications, such as DiagMon and SCOMO.

Software Component Management Object (SCOMO) specification defines the necessary management objects and behavior to manage software components and third party applications resident on a device. There are several proprietary technologies currently used today by vendors such as RIM and modified SCOMO-like implementations in use ahead of the standard from Nokia and Motorola to accomplish application management.

Diagnostics & Monitoring (DiagMon) specification defines the necessary management objects and behavior to read and gather device information over the air such as battery level, signal strength, firmware version, etc.

The solution has been developed in a modular fashion with well-defined interfaces and development tools to facilitate a seamless integration process and flexible business models to meet your needs. Below is a high-level overview of the advanced feature set:

- **Standards-Driven.** mProve DM is fully compliant with the OMA DM 1.2, OMA DL 1.0, OMA DS v1.2, and OMA DM FUMO v1.0 standards. In addition, mProve has successfully participated at OMA TestFests used to demonstrate adherence to these industry standards and interoperability with 3rd party server solutions. OMA TestFests are held every 2-3 months and are designed to ensure the quality of the OMA specifications and provide vendors the ability to test and verify their product implementations with third parties.
- **Versatile Architecture.** mProve's OMA DM Object Extensions empowers OEMs to extend the DM Tree, without need for revising DM core, or impact to the existing use cases. This versatile feature gives OEMs the flexibility to support new use cases such as provisioning, diagnostics, device lock wipe and reset, and to adapt to fast-moving standards.
- **Fault Tolerant.** mProve DM has a built-in self-resuming state machine allowing it to recover from interruptions such as loss of RF coverage or power failure during device management sessions and downloads.
- **Event-Driven Logic.** mProve DM supports event-driven logic to trigger predefined actions such as provisioning or profiling of the device upon SIM change.
- **Customizable Experience.** mProve DM allows customization of the entire user experience. From the look-and-feel of the user interface to the timing and handling of the device management session mProve DM provides complete flexibility.
- **Fully Secured DM Experience.** mProve DM has OMA DM bootstrapping and other security features integrated for security support. It also detects sanity of source images, and tempering of Update Package to ensure peace of mind with FOTA operations.

- Advanced Tool Suite. mProve DM includes a comprehensive suite of applications to streamline and simplify the integration, verification, and validation process.

Q: Does mProve FOTA support NAND flash?

A: Yes, NAND flash is supported. Different configuration parameters are provided in the Generator for both NAND and NOR flash implementations. The mProve Generator enables configuration and definition of the logical flash regions, cached write units, and the ability to specify all the addresses in the Generator configuration in terms of the logical region's RAM addresses (in the case of NAND).

HP has performed commercial integrations of its FOTA products into a broad range of devices with complex architectures such as:

- Multiple CPU / Flash
- Compressed firmware images in NAND
- File System updates, including compressed files systems such as Linux CRAM FS
- Multiple OS's (i.e. Symbian)

Q: What kind of security is in place to prevent an incorrect software package from being downloaded to the device?

A: mProve uses multiple security mechanisms to ensure that the software being downloaded is safe and secure such as decryption, digital signatures, CRC checks at various points throughout the process, and SSL for over-the-air transport security.

Q: What is the size of the mProve client-side footprint?

A: The core mProve FOTA agent is roughly 20 KB. In addition to the core FOTA agent various wrappers will be required, that may increase the overall agent footprint to between 30KB-50KB. The mProve DM agent ranges from 200-300 KB depending upon implementation.

Q: Is the mProve FOTA solution 100% fault tolerant?

A: Yes, the mProve update process is 100% fault tolerant. mProve can recover from interruptions such as power loss, network failure, or unpredictable user behavior with complete fault tolerance. Once power is restored, mProve continues where it left off. The fault tolerance algorithm is protected under US Patent No. 6,832,373, and does not require the use of a reserved write unit, or backup block.

Q: Will user data be lost during a firmware update?

A: No, mProve provides for "exclusion regions" during the firmware update process. This enables regions containing emails, text messages, pictures, etc. to be excluded during the update process. The exclusion regions must be defined during the Update Package creation process with the OEM.

Q: Does the solution provide API support?

A: Yes, mProve supports numerous APIs in the mProve SDK. For instance, the mProve FOTA Update Agent SDK provides a single API function to begin the update process. This function, `ua_doUpdate()`, can be called from code written and controlled by the customer. This function will execute the entire update process. Any dependencies on the device will be handled via calls to the wrapper functions.

Q: Is the mProve FOTA agent updateable?

A: Yes, mProve supports the update of itself in a fault tolerant manner.

Q: Does the mProve DM agent support OMA DM v1.2?

A: Yes, mProve DM supports OMA DM v1.1.2 & v1.2, OMA DL v1.0, FUMO v1.0, DiagMon v1.0, and SCOMO v1.0.

Q: How long does a typical integration take?

A: There are several factors which impact an mProve integration such as what mProve components a customer has selected, the amount of support provided by the customer, etc. A typical mProve FOTA integration lasts about three weeks and two months for combined mProve FOTA & DM integration. For complete interoperability testing of a commercial release which includes project planning, integration, interoperability testing with a server, etc. this takes about 2-3 months.

Q: Does mProve meet the mobile device management requirements from operators such as Verizon, Alltel, Sprint, etc.?

A: Yes, mProve complies with their MDM requirements. In addition, mProve-enabled devices are shipping on each of the networks listed above. HP works closely with OEMs and operators to ensure the mProve solution exceeds customer requirements.