

# PP-Module for MDM Agent



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**National Information Assurance Partnership**

## Revision History

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Version	Date	Comment
1.0	2019-03-01	Initial publication as PP-Module.
1.1	2023-12-11	Added GPOS PP base and incorporated NIAP Technical Decisions.

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# 1 Introduction

## 1.1 Overview

The scope of the MDM Agent PP-Module is to describe the security functionality of a Mobile Device Management (MDM) Agent in terms of [CC] and to define functional and assurance requirements for such products. This PP-Module is intended for use with the following Base-PPs:

- Protection Profile for Mobile Device Management (MDM PP), Version 4.0
- Protection Profile for Mobile Device Fundamentals (MDF PP), Version 3.3
- Protection Profile for General Purpose Operating Systems (GPOS PP), Version 4.3

These Base-PPs are valid because a MDM Agent is either a 3rd party application manufactured by the MDM Server vendor or is a native application deployed on a mobile device.

## 1.2 Terms

The following sections list Common Criteria and technology terms used in this document.

### 1.2.1 Common Criteria Terms

Assurance	Grounds for confidence that a TOE meets the SFRs <a href="#">[CC]</a> .
Base Protection Profile (Base-PP)	Protection Profile used as a basis to build a PP-Configuration.
Collaborative Protection Profile (cPP)	A Protection Profile developed by international technical communities and approved by multiple schemes.
Common Criteria (CC)	Common Criteria for Information Technology Security Evaluation (International Standard ISO/IEC 15408).
Common Criteria Testing Laboratory	Within the context of the Common Criteria Evaluation and Validation Scheme (CCEVS), an IT security evaluation facility accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) and approved by the NIAP Validation Body to conduct Common Criteria-based evaluations.
Common Evaluation Methodology (CEM)	Common Evaluation Methodology for Information Technology Security Evaluation.
Distributed TOE	A TOE composed of multiple components operating as a logical whole.
Extended Package (EP)	A deprecated document form for collecting SFRs that implement a particular protocol, technology, or functionality. See Functional Packages.
Functional Package (FP)	A document that collects SFRs for a particular protocol, technology, or functionality.
Operational Environment (OE)	Hardware and software that are outside the TOE boundary that support the TOE functionality and security policy.
Protection Profile (PP)	An implementation-independent set of security requirements for a category of products.
Protection Profile Configuration (PP-Configuration)	A comprehensive set of security requirements for a product type that consists of at least one Base-PP and at least one PP-Module.
Protection Profile Module (PP-Module)	An implementation-independent statement of security needs for a TOE type complementary to one or more Base-PPs.
Security Assurance	A requirement to assure the security of the TOE.

Requirement (SAR)	
Security Functional Requirement (SFR)	A requirement for security enforcement by the TOE.
Security Target (ST)	A set of implementation-dependent security requirements for a specific product.
Target of Evaluation (TOE)	The product under evaluation.
TOE Security Functionality (TSF)	The security functionality of the product under evaluation.
TOE Summary Specification (TSS)	A description of how a TOE satisfies the SFRs in an ST.

### 1.2.2 Technical Terms

Administrator	The person who is responsible for management activities, including setting the policy that is applied by the enterprise on the mobile device.
Enrolled State	The state in which a mobile device is managed by a policy from an MDM.
Mobile Application Store (MAS)	Mobile Application Store
Mobile Device Management (MDM)	Mobile Device Management
Mobile Device User	The person who uses and is held responsible for a mobile device.
Operating System	Software which runs at the highest privilege level and can directly control hardware resources. Modern mobile devices typically have at least two primary operating systems: one which runs on the cellular baseband processor and one which runs on the application processor. The platform of the application processor handles most user interaction and provides the execution environment for apps. The platform of the cellular baseband processor handles communications with the cellular network and may control other peripherals. The term OS, without context, may be assumed to refer to the platform of the application
Unenrolled State	The state in which a mobile device is not managed by an MDM system.
User	See Mobile Device User.

## 1.3 Compliant Targets of Evaluation

The MDM system consists of two primary components: the MDM Server software and the MDM Agent. This PP-Module specifically addresses the MDM Agent. The MDM Agent establishes a secure connection back to the MDM Server, from which it receives policies to enforce on the mobile device. Optionally, the MDM Agent interacts with the Mobile Application Store (MAS) Server to download and install enterprise-hosted applications.

A compliant MDM Agent is installed on a mobile device as an application (supplied by the developer of the MDM Server software) or is part of the mobile device's OS. This PP-Module builds on either the MDF PP or the MDM PP. A TOE that claims conformance to this PP-Module must also claim conformance to one of those PPs as its Base-PP. A compliant TOE is obligated to implement the functionality required in the Base-PP along with the additional functionality defined in this PP-Module in order to mitigate the threats that are defined by this PP-Module.

This PP-Module shall build on the MDF PP if the TOE is a native part of a mobile operating system. The TOE for this PP-Module combined with the MDF PP is the mobile device itself plus the MDM Agent. If the MDM

Agent is part of the mobile device's OS, the MDM Agent may present multiple interfaces for configuring the mobile device, such as a local interface and a remote interface. Agents conforming to this PP-Module must at least offer an interface with a trusted channel that serves as one piece of an MDM system. Conformant MDM Agents may also offer other interfaces, and the configuration aspects of these additional interfaces are in scope of this PP-Module.

This PP-Module shall build on the MDM Server PP if the TOE is a third-party application that is provided with an MDM Server and installed on a mobile device by the user after acquiring the mobile device. The distributed TOE for this PP-Module combined with the MDM Server PP is the entire MDM environment, which includes both the MDM Server and the MDM Agent. Even though the mobile device itself is not part of the TOE, it is expected to be evaluated against the MDF PP so that its baseline security capabilities can be assumed to be present.

### 1.3.1 TOE Boundary

Figure 1 shows a high-level example of the PP-Module TOE boundary and its Operational Environment. As stated above, the MDM Agent may either be provided as part of the mobile device itself (shown in red) or distributed as a third-party application from the developer of the MDM Server software (shown in blue).



**Figure 1: MDM Agent Operating Environment**

The MDM Agent must closely interact with or be part of the mobile device's platform in order to establish policies and to perform queries about device status. The mobile device, in turn, has its own security requirements specified in the MDF PP.

## 1.4 Use Cases

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This PP-Module defines 4 use cases:

### **[USE CASE 1] Enterprise-owned device for general-purpose enterprise use**

An Enterprise-owned device for general-purpose business use is commonly called Corporately Owned, Personally Enabled (COPE). This use case entails a significant degree of Enterprise control over configuration and software inventory. Enterprise administrators use an MDM product to establish policies on the mobile devices prior to user issuance. Users may use Internet connectivity to browse the web or access corporate mail or run Enterprise applications, but this connectivity may be under significant control of the Enterprise. The user may also be expected to store data and use applications for personal, non-enterprise use. The Enterprise administrator uses the MDM product to deploy security policies and query mobile device status. The MDM may issue commands for remediation actions.

### **[USE CASE 2] Enterprise-owned device for specialized, high-security use**

An Enterprise-owned device with intentionally limited network connectivity, tightly controlled configuration, and limited software inventory is appropriate for specialized, high-security use cases. As in the previous use case, the MDM product is used to establish such policies on mobile devices prior to issuance to users. The device may not be permitted connectivity to any external peripherals. It may only be able to communicate via its Wi-Fi or cellular radios with the Enterprise-run network, which may not even permit connectivity to the Internet. Use of the device may require compliance with usage policies that are more restrictive than those in any general-purpose use case, yet may mitigate risks to highly sensitive information. Based upon the operation environment and the acceptable risk level of the enterprise, those security functional requirements outlined in Section 5 of this PP-Module along with the selections in the Use Case 2 template defined in are sufficient for the high-security use case.

### **[USE CASE 3] Personally owned device for personal and enterprise use**

A personally owned device, which is used, for both personal activities and enterprise data is commonly called Bring Your Own Device (BYOD). The device may be provisioned for access to enterprise resources after significant personal usage has occurred. Unlike in the enterprise-owned cases, the enterprise is limited in what security policies it can enforce because the user purchased the device primarily for personal use and is unlikely to accept policies that limit the functionality of the device.

However, because the Enterprise allows the user full (or nearly full) access to the Enterprise network, the Enterprise will require certain security policies, for example a password or screen lock policy, and health reporting, such as the integrity of the mobile device system software, before allowing access. The administrator of the MDM can establish remediation actions, such as wipe of the Enterprise data, for non-compliant devices. These controls could potentially be enforced by a separation mechanism built-in to the device itself to distinguish between enterprise and personal activities, or by a third-party application that provides access to enterprise resources and leverages security capabilities provided by the mobile device. Based upon the Operational Environment and the acceptable risk level of the enterprise, those security functional requirements outlined in Section 5 of this PP-Module along with the selections in the Use Case 3 template defined in are sufficient for the secure implementation of this BYOD use case.

### **[USE CASE 4] Personally owned device for personal and limited enterprise use**

A personally owned device may also be given access to limited enterprise services such as enterprise email. Because the user does not have full access to the enterprise or enterprise data, the enterprise may

not need to enforce any security policies on the device. However, the enterprise may want secure email and web browsing with assurance that the services being provided to those clients by the mobile device are not compromised. Based upon the Operational Environment and the acceptable risk level of the enterprise, those security functional requirements outlined in Section 5 of this PP-Module are sufficient for the secure implementation of this BYOD use case.

# 2 Conformance Claims

## Conformance Statement

This PP-Module inherits exact conformance as required from the specified Base-PP and as defined in the CC and CEM addenda for Exact Conformance, Selection-Based SFRs, and Optional SFRs (dated May 2017).

The following PPs and PP-Modules are allowed to be specified in a PP-Configuration with this PP-Module.

- collaborative PP-Module for Biometric enrollment and verification - for unlocking the device, Version 1.1
- PP-Module for Bluetooth, Version 1.0
- PP-Module for VPN Client, Version 2.4
- PP-Module for Wireless LAN Clients, Version 1.0

## CC Conformance Claims

This PP-Module is conformant to Parts 2 (extended) and 3 (conformant) of Common Criteria Version 3.1, Release 5 [CC].

## PP Claim

This PP-Module does not claim conformance to any other Protection Profile.

## Package Claim

- This PP-Module is Functional Package for TLS Version 1.1 Conformant.
- This PP-Module is Functional Package for TLS Version 2.0 Conformant.



# 3 Security Problem Definition

## 3.1 Threats

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The following threats are specific to MDM Agents, and represents an addition to those identified in the Base-PPs.

### **T.MALICIOUS\_APPS**

FILL IN

### **T.BACKUP**

An attacker may try to target backups of data or credentials and exfiltrate data. Since the backup is stored on either a personal computer or end user's backup repository, it's not likely the enterprise would detect compromise.

### **T.NETWORK\_ATTACK**

FILL IN

### **T.NETWORK\_EAVESDROP**

FILL IN

### **T.PHYSICAL\_ACCESS**

FILL IN

## 3.2 Assumptions

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These assumptions are made on the Operational Environment (OE) in order to be able to ensure that the security functionality specified in the PP-Module can be provided by the TOE. If the TOE is placed in an OE that does not meet these assumptions, the TOE may no longer be able to provide all of its security functionality.

### **A.CONNECTIVITY**

The TOE relies on network connectivity to carry out its management activities. The TOE will robustly handle instances when connectivity is unavailable or unreliable.

### **A.PLATFORM**

The MDM Agent relies upon mobile platform and hardware evaluated against the MDF PP and assured to provide policy enforcement as well as cryptographic services and data protection. The mobile platform provides trusted updates and software integrity verification of the MDM Agent.

### **A.PROPER\_ADMIN**

One or more competent, trusted personnel who are not careless, willfully negligent, or hostile, are assigned and authorized as the TOE Administrators, and do so using and abiding by guidance documentation.

### **A.PROPER\_USER**

Mobile device users are not willfully negligent or hostile, and use the device within compliance of a reasonable Enterprise security policy.

## 3.3 Organizational Security Policies

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An organization deploying the TOE is expected to satisfy the organizational security policy listed below in addition to all organizational security policies defined by the claimed Base-PP.

### **P.ACCOUNTABILITY**

Personnel operating the TOE shall be accountable for their actions within the TOE.

### **P.ADMIN**

The configuration of the mobile device security functions must adhere to the Enterprise security policy.

### **P.DEVICE\_ENROLL**

A mobile device must be enrolled for a specific user by the administrator of the MDM prior to being used in the Enterprise network by the user.

### **P.NOTIFY**

The mobile user must immediately notify the administrator if a mobile device is lost or stolen so that the administrator may apply remediation actions via the MDM system.

# 4 Security Objectives

## 4.1 Security Objectives for the TOE

### O.ACCOUNTABILITY

The TOE must provide logging facilities, which record management actions undertaken by its administrators.

### O.APPLY\_POLICY

The TOE must facilitate configuration and enforcement of enterprise security policies on mobile devices via interaction with the mobile OS and the MDM Server. This will include the initial enrollment of the device into management, through its entire lifecycle, including policy updates and its possible unenrollment from management services.

### O.DATA\_PROTECTION\_TRANSIT

Data exchanged between the MDM Server and the MDM Agent must be protected from being monitored, accessed, or altered.

### O.STORAGE

To address the issue of loss of confidentiality of user data in the event of loss of a mobile device (T.PHYSICAL), conformant TOEs will use platform provide key storage. The TOE is expected to protect its persistent secrets and private keys.

## 4.2 Security Objectives for the Operational Environment

The OE of the TOE implements technical and procedural measures to assist the TOE in correctly providing its security functionality (which is defined by the security objectives for the TOE). The security objectives for the OE consist of a set of statements describing the goals that the OE should achieve. This section defines the security objectives that are to be addressed by the IT domain or by non-technical or procedural means. The assumptions identified in Section 3 are incorporated as security objectives for the environment.

### OE.DATA\_PROPER\_ADMIN

TOE Administrators are trusted to follow and apply all administrator guidance in a trusted manner.

### OE.DATA\_PROPER\_USER

Users of the mobile device are trained to securely use the mobile device and apply all guidance in a trusted manner.

### OE.IT\_ENTERPRISE

The Enterprise IT infrastructure provides security for a network that is available to the TOE and mobile devices that prevents unauthorized access.

### OE.MOBILE\_DEVICE\_PLATFORM

The MDM Agent relies upon the trustworthy mobile platform and hardware to provide policy enforcement as well as cryptographic services and data protection. The mobile platform provides trusted updates and software integrity verification of the MDM Agent.

### OE.WIRELESS\_NETWORK

A wireless network will be available to the mobile devices.

## 4.3 Security Objectives Rationale

This section describes how the assumptions, threats, and organizational security policies map to the security objectives.

Table 1: Security Objectives Rationale

Threat, Assumption, or OSP	Security Objectives	Rationale
T.MALICIOUS_APPS	O.DATA_PROTECTION_TRANSIT	The threat T.MALICIOUS_APPS is countered by O.DATA_PROTECTION_TRANSIT as this provides the capability to protect app loading/updates against malicious insertion from the network.
	O.APPLY_POLICY	The threat T.MALICIOUS_APPS is countered by O.APPLY_POLICY as this provides policy preventing loading of unapproved apps into the TOE.
T.BACKUP	O.DATA_PROTECTION_TRANSIT	The threat T.BACKUP is countered by O.DATA_PROTECTION_TRANSIT as this provides the capability to communicate using one (or more) standard protocols as a means to maintain the confidentiality of data

		that are transmitted between the Agent and other entities.
	O.APPLY_POLICY	The threat T.BACKUP is countered by O.APPLY_POLICY as this provides policy to enforce that backups be stored only in secure, protected locations.
T.NETWORK_ATTACK	O.DATA_PROTECTION_TRANSIT	The threat T.NETWORK_ATTACK is countered by O.DATA_PROTECTION_TRANSIT as this provides the capability to communicate using one (or more) standard protocols as a means to maintain the confidentiality of data that are transmitted between the Agent and other entities.
	O.APPLY_POLICY	The threat T.NETWORK_ATTACK is countered by O.APPLY_POLICY as this provides a secure configuration of the Agent to protect data that it processes.
	OE.IT_ENTERPRISE	The threat T.NETWORK_ATTACK is countered by OE.IT_ENTERPRISE by reducing the network exposure of the mobile device.
T.NETWORK_EAVESDROP	O.DATA_PROTECTION_TRANSIT	The threat T.NETWORK_EAVESDROP is countered by O.DATA_PROTECTION_TRANSIT as this provides the capability to communicate using one (or more) standard protocols as a means to maintain the confidentiality of data that are transmitted between the Agent and other entities.
	O.APPLY_POLICY	The threat T.NETWORK_EAVESDROP is countered by O.APPLY_POLICY as this provides a secure configuration of the Agent to protect data that it processes.
	OE.IT_ENTERPRISE	The threat T.NETWORK_EAVESDROP is countered by OE.IT_ENTERPRISE by reducing the network exposure of the mobile device.
T.PHYSICAL_ACCESS	O.ACCOUNTABILITY	The threat T.PHYSICAL_ACCESS is countered by O.ACCOUNTABILITY as this provides the capability to log attempts by unauthorized personnel to access data, and to log any access to the data or the device, as well as changes to the device during the time when it is not under the control of an authorized user.
	O.APPLY_POLICY	The threat T.PHYSICAL_ACCESS is countered by O.APPLY_POLICY as this provides a secure configuration of the Agent to protect data that it processes.
	O.STORAGE	The threat T.PHYSICAL_ACCESS is countered by O.STORAGE as this provides the capability to encrypt all user and enterprise data and authentication keys to ensure the confidentiality of data that it stores.
A.CONNECTIVITY	OE.WIRELESS_NETWORK	The Operational Environment objective OE.WIRELESS_NETWORK is realized through A.CONNECTIVITY.
A.PLATFORM	OE.MOBILE_DEVICE_PLATFORM	The Operational Environment objective OE.MOBILE_DEVICE_PLATFORM is realized through A.PLATFORM.
A.PROPER_ADMIN	OE.DATA_PROPER_ADMIN	The Operational Environment objective OE.DATA_PROPER_ADMIN is realized through A.PROPER_ADMIN.
A.PROPER_USER	OE.DATA_PROPER_USER	The Operational Environment objective OE.DATA_PROPER_USER is realized through A.PROPER_USER.
P.ACCOUNTABILITY	O.ACCOUNTABILITY	O.ACCOUNTABILITY provides logging of personnel actions in order to provide accountability of all personnel actions within the TOE.
P.ADMIN	O.APPLY_POLICY	The TOE adheres to the Enterprise security policy through the application of O.APPLY_POLICY.
P.DEVICE_ENROLL	O.APPLY_POLICY	The TOE enrolls mobile devices for specific users with policy through the application of O.APPLY_POLICY.

P.NOTIFY

O.APPLY\_POLICY

The TOE provides the capability for the administrator to apply remediation actions via the MDM system through policy, which is applied through O.APPLY\_POLICY.

# 5 Security Requirements

This chapter describes the security requirements which have to be fulfilled by the product under evaluation. Those requirements comprise functional components from Part 2 and assurance components from Part 3 of [CC]. The following conventions are used for the completion of operations:

- **Refinement** operation (denoted by **bold text** or ~~striketrough text~~): Is used to add details to a requirement (including replacing an assignment with a more restrictive selection) or to remove part of the requirement that is made irrelevant through the completion of another operation, and thus further restricts a requirement.
- **Selection** (denoted by *italicized text*): Is used to select one or more options provided by the [CC] in stating a requirement.
- **Assignment** operation (denoted by *italicized text*): Is used to assign a specific value to an unspecified parameter, such as the length of a password. Showing the value in square brackets indicates assignment.
- **Iteration** operation: Is indicated by appending the SFR name with a slash and unique identifier suggesting the purpose of the operation, e.g. "/EXAMPLE1."

## 5.1 MDM Agent PP Security Functional Requirements Direction

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In a PP-Configuration that includes the MDM Agent PP, the TOE is expected to rely on some of the security functions implemented by the MDM Agent as a whole and evaluated against the MDM Agent PP. The following sections describe any modifications that the ST author must make to the SFRs defined in the MDM Agent PP in addition to what is mandated by [Section 5.3 TOE Security Functional Requirements](#).

### 5.1.1 Modified SFRs

This PP-Module does not modify any SFRs defined by the MDM Agent PP.

### 5.1.2 Additional SFRs

This section defines additional SFRs that must be added to the TOE boundary in order to implement the functionality in any PP-Configuration where the MDM Agent PP is claimed as the Base-PP.

#### 5.1.2.1 Cryptographic Support (FCS)

##### FCS\_STG\_EXT.4 Cryptographic Key Storage

FCS\_STG\_EXT.4.1

The MDM Agent shall use the platform provided key storage for all persistent secret and private keys.

**Application Note:** This requirement ensures that persistent secrets (credentials, secret keys, authentication token) and private keys are stored securely when not in use by the mobile platform.

#### 5.1.2.2 Trusted Path/Channels (FTP)

##### FTP\_ITC\_EXT.1/MDFCHANNEL Trusted Channel Communication

FTP\_ITC\_EXT.1.1/MDFCHANNEL

**Refinement:** The TSF shall use [selection:

- *mutually authenticated TLS client as defined in the Package for Transport Layer Security*
- *mutually authenticated DTLS client as defined in the Package for Transport Layer Security*
- *HTTPS*

] to provide a communication channel between itself and another trusted IT product that is logically distinct from other communication channels, provides assured identification of its end points, protects channel data from disclosure, and detects modification of the channel data.

**Application Note:** The intent of this requirement is to protect the communications channel between MDM Server and Agent, post enrollment. [FTP\\_TRP.1/MDFENROLL](#) is to protect the communications channel between MDM Server and Agent during enrollment.

This requirement is to ensure that the transmission of any audit logs, mobile device information data (software version, hardware model, and application versions), and configuration data collected by the MDM Agent and sent from the MDM Agent to the MDM Server, when commanded, or at configurable intervals, is properly protected. This trusted channel also protects any commands and policies sent by the MDM Server to the MDM Agent. Either the MDM Agent or the MDM Server is able to initiate the connection.

This requirement is iterated from the MDF PP to indicate the protocols that the MDM Agent can use for a trusted channel. The mobile device is required to perform the mandated cryptographic protocols as in the Base-PP for communication channels mandated in the MDF PP. The ST author must select one of TLS, DTLS, or HTTPS in order to establish and maintain a trusted channel between the MDM Agent and the MDM Server. Only TLS, DTLS, or HTTPS are acceptable for this trusted channel.

Since this requirement is only for the case when the PP-Module builds on MDF PP and in this case it is expected that the MDM Agent will be a native part of the mobile operating system, it is expected that the MDM Agent will utilize the mobile device's implementation of the selected protocols. HTTPS (FCS\_HTTPS\_EXT.1) and TLS (FCS\_TLSC\_EXT.1) are already mandatory for a MDF ST. If "TLS" or "DTLS" is selected the following selections from the TLS Functional Package must be made:

- FCS\_TLS\_EXT.1:
  - either TLS or DTLS is selected depending on the selection made in FTP\_ITC\_EXT.1.1
  - client must be selected
- FCS\_TLSC\_EXT.1.1:
  - The cipher suites selected must correspond with the algorithms and hash functions allowed in FCS\_COP.1 from the MDF PP.
  - mutual authentication must be selected

Protocol, RBG, Certificate validation, algorithm, and similar services may be met with platform provided services.

#### FTP\_ITC\_EXT.1.2/MDFCHANNEL

**Refinement:** The TSF shall permit the TSF and the MDM Server and [selection: MAS Server, no other IT entities ] to initiate communication via the trusted channel.

**Application Note:** For all other use cases, the mobile device initiates the communication; however, for MDM Agents, the MDM Server may also initiate communication.

#### FTP\_ITC\_EXT.1.3/MDFCHANNEL

**Refinement:** The TSF shall initiate communication via the trusted channel for all communication between the MDM Agent and the MDM Server and [selection: all communication between the MAS Server and the MDM Agent, no other communication ]

**Application Note:** This element is iterated from the MDF PP; it is expected that the mobile device will initiate the trusted channel between the MDM Agent and the MDM Server for administrative communication and may initiate other trusted channels to other trusted IT entities for other uses.

### FTP\_TRP.1/MDFENROLL Trusted Path (for Enrollment)

#### FTP\_TRP.1.1/MDFENROLL

**Refinement:** The TSF shall use [selection:

- TLS client as defined in the Package for Transport Layer Security
- HTTPS

] to provide a trusted communication path between itself and another trusted IT product that is logically distinct from other communication paths and provides assured identification of its endpoints and protection of the communicated data from disclosure and detection of modification of the communicated data from [modification, disclosure].

#### FTP\_TRP.1.2/MDFENROLL

**Refinement:** The TSF shall permit MD users to initiate communication via the trusted path.

#### FTP\_TRP.1.3/MDFENROLL

**Refinement:** The TSF shall require the use of the trusted path for [[all MD user actions]].

**Application Note:** This requirement ensures that authorized MD users initiate all communication with the TOE via a trusted path, and that all communications with the TOE by MD users is performed over this path. The purpose of this connection is for enrollment by the MD user.

The ST author chooses the mechanism or mechanisms supported by the TOE. The data passed in this trusted communication channel are encrypted as defined

by the protocol selected.

Since this requirement is only for the case when the PP-Module builds on MDF PP and in this case it is expected that the MDM Agent will be a native part of the mobile operating system, it is expected that the MDM Agent will utilize the mobile device's implementation of the selected protocols. HTTPS (FCS\_HTTPS\_EXT.1) and TLS (FCS\_TLSC\_EXT.1) are already mandatory for a MDF ST. If "TLS" or "DTLS" is selected the following selections from the TLS Functional Package must be made:

- FCS\_TLS\_EXT.1:
  - TLS must be selected
  - client must be selected
- FCS\_TLSC\_EXT.1.1:
  - The cipher suites selected must correspond with the algorithms and hash functions allowed in FCS\_COP.1 from the MDF PP.

## 5.2 MDM PP Security Functional Requirements Direction

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In a PP-Configuration that includes the MDM PP, the TOE is expected to rely on some of the security functions implemented by the MDM Agent as a whole and evaluated against the MDM PP. The following sections describe any modifications that the ST author must make to the SFRs defined in the MDM PP in addition to what is mandated by [Section 5.3 TOE Security Functional Requirements](#).

### 5.2.1 Modified SFRs

This PP-Module does not modify any SFRs defined by the MDM PP.

### 5.2.2 Additional SFRs

This section defines additional SFRs that must be added to the TOE boundary in order to implement the functionality in any PP-Configuration where the MDM PP is claimed as the Base-PP.

#### 5.2.2.1 Cryptographic Support (FCS)

##### FCS\_STG\_EXT.1/MDMKEYS Cryptographic Key Storage

FCS\_STG\_EXT.1.1/MDMKEYS

**Refinement:** The MDM Agent shall use the [*platform-provided key storage*] for all persistent secret and private keys.

**Application Note:** This requirement ensures that persistent secrets (credentials, secret keys) and private keys are stored securely when not in use by the mobile platform.

## 5.3 TOE Security Functional Requirements

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The following section describes the SFRs that must be satisfied by any TOE that claims conformance to this PP-Module. These SFRs must be claimed regardless of which PP-Configuration is used to define the TOE.

### 5.3.1 Security Audit (FAU)

##### FAU\_ALT\_EXT.2 Agent Alerts

FAU\_ALT\_EXT.2.1

The MDM Agent shall provide an alert via the trusted channel to the MDM Server in the event of any of the following audit events:

- successful application of policies to a mobile device,
- [**selection:** *receiving, generating* ] periodic reachability events,
- [**selection:**
  - *change in enrollment state*
  - *failure to install an application from the MAS Server*
  - *failure to update an application from the MAS Server*
  - [**assignment:** *other events*]
  - *no other events*

].

**Application Note:** The trusted channel is defined in FPT\_ITT.1(2) of the Base-PP if the TOE claims the MDM PP and [FTP\\_ITC\\_EXT.1/MDFCHANNEL](#) in this PP-Module if the TOE claims the MDF PP. "Alert" in this requirement could be as simple as an audit record or a notification. If any prior alerts exist in the queue, per [FAU\\_ALT\\_EXT.2.2](#), those alerts must be sent when the trusted channel is

available.

This requirement is to ensure that the MDM Agent must notify the MDM Server whenever one of the events listed above occurs. Lack of receipt of a successful policy installation indicates the failure of the policy installation.

The periodic reachability events ensure that either the MDM Agent responds to MDM Server polls to determine device network reachability, or the MDM Agent can be configured to regularly notify the Server that it is reachable. The ST author must select “receiving” in the first case and “generating” in the second. The corresponding requirement for the MDM Server is FAU\_NET\_EXT.1 in the MDM PP.

The ST author must either assign further events or select the “no other events” option. Note that alerts may take time to reach the MDM Server, or not arrive, due to poor connectivity.

#### FAU\_ALT\_EXT.2.2

The MDM Agent shall queue alerts if the trusted channel is not available.

**Application Note:** If the trusted channel is not available, alerts must be queued. When the trusted channel becomes available, the queued alerts must be sent.

### FAU\_GEN.1/AGENT Audit Data Generation

#### FAU\_GEN.1.1/AGENT

**Refinement:** The MDM Agent shall [**selection:** *invoke platform-provided functionality, implement functionality*] to generate an MDM Agent audit record of the following auditable events:

- a. Startup and shutdown of the MDM Agent;
- b. All auditable events for [*not specified*] level of audit; and
- c. [*MDM policy updated, any modification commanded by the MDM Server, specifically defined auditable events listed in Table 2, and*] [**selection:** *[assignment: other events], no other events* ]].

**Application Note:** This requirement outlines the information to be included in the MDM Agent’s audit records. The ST author can include other auditable events directly in the Auditable Events table in [FAU\\_GEN.1.1/AGENT](#); they are not limited to the list presented.

MDM policy update must minimally indicate that an update to policy occurred. The event record need not contain the differences between the prior policy and the new policy; optionally, the specific change(s) to policy that were included in that update may be detailed. All updates to policy should trigger this alert. Modifications commanded by the MDM Server are those commands listed in FMT\_SMF.1.1.

The selection for the [FMT\\_UNR\\_EXT.1](#) auditable event in the Auditable Events table corresponds to the selection in [FMT\\_UNR\\_EXT.1](#). If “apply remediation actions” is selected in [FMT\\_UNR\\_EXT.1](#), then the ST author selects “attempt to unenroll” in [FAU\\_GEN.1.1/AGENT](#) Auditable Events table for [FMT\\_UNR\\_EXT.1](#); otherwise, “none” is selected.

#### FAU\_GEN.1.2/AGENT

**Refinement:** The [**selection:** *TSF, TOE platform*] shall record within each MDM Agent audit record at least the following information:

- a. Date and time of the event, type of event, subject identity, (if relevant) the outcome (success or failure) of the event, and additional information in Table 2; and
- b. For each audit event type, based on the auditable event definitions of the functional components included in the PP-Module/ST, [**assignment:** *other audit relevant information*].

**Application Note:** All audits must contain at least the information mentioned in [FAU\\_GEN.1.2/AGENT](#), but may contain more information which can be assigned. The ST author must identify in the TSS which information of the audit record that is performed by the MDM Agent and that which is performed by the MDM Agent’s platform.

### FAU\_SEL.1/AGENT Security Audit Event Selection



**Refinement:** The TSF shall [**selection:** *invoke platform-provided functionality, implement functionality* ] to select the set of events to be audited from the set of all auditable events based on the following attributes:

- a. *[event type]*
- b. *[success of auditable security events, failure of auditable security events, **assignment:** other attributes]*.

**Application Note:** The intent of this requirement is to identify all criteria that can be selected to trigger an audit event. For the ST author, the assignment is used to list any additional criteria or “no other attributes”. This selection may be configured by the MDM Server.

### 5.3.2 Identification and Authentication (FIA)

#### FIA\_ENR\_EXT.2 Agent Enrollment of Mobile Device into Management

FIA\_ENR\_EXT.2.1

The MDM Agent shall record the reference identifier of the MDM Server during the enrollment process.

**Application Note:** The reference identifier of the MDM Server may be the Distinguished Name, Domain Name, and/or the IP address of the MDM Server. This requirement allows the specification of the information to be used to establish a network connection and the reference identifier for authenticating the trusted channel between the MDM Server and MDM Agent, as defined in the MDM PP.

### 5.3.3 Security Management (FMT)

#### FMT\_POL\_EXT.2 Agent Trusted Policy Update

FMT\_POL\_EXT.2.1

The MDM Agent shall only accept policies and policy updates that are digitally signed by a private key that has been authorized for policy updates by the MDM Server.

**Application Note:** The intent of this requirement is to cryptographically tie the policies to the enterprise that mandated the policy, not to protect the policies in transit, as this is addressed by other SFRs (the MDM Base-PP SFR FPT\_ITT.1(2) or the Additional SFRs [FTP\\_ITC\\_EXT.1/MDFCHANNEL](#) or [FTP\\_ITC\\_EXT.1/OSCHANNEL](#), depending on the Base-PP being claimed). This is especially critical for users who connect to multiple enterprises.

Policies must be digitally signed by the enterprise using the algorithms in FCS\_COP.1(3) in the MDM PP.

The signing private key is associated with a certificate or raw public key used by the agent to verify the signature on the policy.

FMT\_POL\_EXT.2.2

The MDM Agent shall not install policies if the signature check fails.

#### FMT\_SMF\_EXT.4 Specification of Management Functions

FMT\_SMF\_EXT.4.1

The MDM Agent shall be capable of interacting with the platform to perform the following functions:

- [**selection:** *Import the certificates to be used for authentication of MDM Agent communications, Import the server public key* ],
- [**selection:** *administrator-provided management functions in MDF PP, administrator-provided device management functions in MDM PP* ]
- [**selection:** [**assignment:** *additional functions*], *no additional functions* ].

**Application Note:** This requirement captures all the configuration functionality in the MDM Agent to configure the underlying mobile device with the configuration policies sent from the MDM Server to the Agent. The ST author selects the Base-PP (MDF PP or MDM PP) as the source of the management functions.

The administrator-provided management functions in MDF PP are specified in Column 4 of Table 5 in MDF PP and in FPT\_TUD\_EXT.1 (for version queries). The administrator-provided device management functions in MDM PP are

specified in FMT\_SMF.1.1(1); the functions in the selection of FMT\_SMF.1.1(1) in the MDM PP are required to correspond to the functions available on the platforms supported by the MDM Agent.

The ST author can add more commands and configuration policies by completing the assignment statement; the mobile device must support these additional commands or configuration policies.

The agent must configure the platform based on the commands and configuration policies received from the MDM Server. The ST author must not claim any functionality not provided by the supported mobile device(s). All selections and assignments performed by the ST author in this requirement should match the selections and assignments of the validated mobile device ST.

#### FMT\_SMF\_EXT.4.2

The MDM Agent shall be capable of performing the following functions:

- Enroll in management
- Configure whether users can unenroll from management
- **[selection:** *configure periodicity of reachability events*, **[assignment:** *other management functions*], *no other functions* ].

**Application Note:** This requirement captures all of the configuration in the MDM Agent for configuration of itself.

If the MDM Agent is a part of the mobile device, enrollment is a single function both of the Agent and of the mobile device (FMT\_SMF\_EXT.4.1).

If the MDM Agent is an application developed separately from the mobile device, the MDM Agent performs the function “enroll the mobile device in management” (per FMT\_SMF\_EXT.4.1) by registering itself to the mobile device as a device administrator. The Agent itself is enrolled in management by configuring the MDM Server to which the Agent answers.

If the MDM Agent does not support unenrollment prevention, remediation actions should be applied upon unenrollment (per FMT\_UNR\_EXT.1).

If the Agent generates periodic reachability events in FAU\_ALT\_EXT.2.1 and the periodicity of these events is configurable, “configure periodicity of reachability events” must be selected.

### FMT\_UNR\_EXT.1 User Unenrollment Prevention

#### FMT\_UNR\_EXT.1.1

The MDM Agent shall provide a mechanism to enforce the following behavior upon an attempt to unenroll the mobile device from management: **[selection:** *prevent the unenrollment from occurring, apply remediation actions* ].

**Application Note:** Unenrolling is the action of transitioning from the enrolled state to the unenrolled state. If preventing the user from unenrolling is configurable, administrators configure whether users are allowed to unenroll through the MDM Server.

For those configurations where unenrollment is allowed, for example a BYOD usage, the MDF PP describes remediation actions performed upon unenrollment, such as wiping enterprise data, in FMT\_SMF\_EXT.2.1; however, the MDM Agent is limited to those actions supported by the mobile device on which the Agent is operating.

## 5.4 TOE Security Functional Requirements Rationale

The following rationale provides justification for each security objective for the TOE, showing that the SFRs are suitable to meet and achieve the security objectives:

**Table 2: SFR Rationale**

Objective	Addressed by	Rationale
O.ACCOUNTABILITY	FAU_ALT_EXT.2	The PP-Module includes FAU_ALT_EXT.2 to support this objective by requiring the TSF to generate alerts back to an MDM Server when security-relevant events occur.

	FAU_GEN.1/AGENT	The PP-Module includes FAU_GEN.1/AGENT to support this objective by defining the security-relevant events for which the TSF must generate audit records.
	FAU_SEL.1/AGENT	The PP-Module includes FAU_SEL.1/AGENT to support this objective by defining how the set of audited events can be configured.
	FAU_STG_EXT.3 (objective)	The PP-Module includes FAU_STG_EXT.3 to support this objective by optionally requiring the TSF to use platform-provided storage for the security-relevant audit data it generates.
O.APPLY_POLICY	FIA_ENR_EXT.2	The PP-Module includes FIA_ENR_EXT.2 to support this objective by requiring the TSF to identify the MDM Server so that the authenticity of policy updates can be determined.
	FMT_POL_EXT.2	The PP-Module includes FMT_POL_EXT.2 to support this objective by requiring the TSF to only accept policy data that can prove its authenticity with a digital certificate.
	FMT_SMF_EXT.4	The PP-Module includes FMT_SMF_EXT.4 to support this objective by defining the management functions the TSF must implement to support its own configuration.
	FMT_UNR_EXT.1	The PP-Module includes FMT_UNR_EXT.1 to support this objective by preventing a user-directed unenrollment operation that would allow for MDM policies to be ignored.
	FPT_NET_EXT.1 (objective)	The PP-Module includes FPT_NET_EXT.1 to support this objective by optionally requiring the TSF to detect when a sustained communications outage with the MDM Server has occurred to indicate that the TSF may be deprived of updated policy data.
O.DATA_PROTECTION_TRANSIT	FCS_DTLSC_EXT.1 (from TLS Package)	The PP-Module includes FCS_DTLSC_EXT.1 from the TLS package by reference to support this objective because DTLS is one of the protocols the PP-Module allows to protect data in transit.
	FCS_DTLSS_EXT.1 (from TLS Package)	The PP-Module includes FCS_DTLSS_EXT.1 from the TLS package by reference to support this objective because DTLS is one of the protocols the PP-Module allows to protect data in transit.
	FCS_TLS_EXT.1 (from TLS Package)	The PP-Module includes FCS_TLS_EXT.1 from the TLS package by reference to support this objective because it is mandatory to claim when the TLS Package applies so that the TSF's usage of TLS is clearly defined.
	FCS_TLSC_EXT.1 (from TLS Package)	The PP-Module includes FCS_TLSC_EXT.1 from the TLS package by reference to support this objective because TLS is one of the protocols the PP-Module allows to protect data in transit.
	FCS_TLSC_EXT.2 (from TLS Package)	The PP-Module includes FCS_TLSC_EXT.2 from the TLS package by reference to support this objective because it requires TLS to be mutually-authenticated if claimed.
	FCS_TLSS_EXT.1 (from TLS Package)	The PP-Module includes FCS_TLSS_EXT.1 from the TLS package by reference to support this objective because TLS is one of the protocols the PP-Module allows to protect data in transit.
	FCS_TLSS_EXT.2 (from TLS Package)	The PP-Module includes FCS_TLSS_EXT.2 from the TLS package by reference to support this objective because it requires TLS to be mutually-authenticated if claimed.

	<a href="#">FTP_ITC_EXT.1/MDFCHANNEL</a> (if MDF is Base-PP)	The PP-Module includes <a href="#">FTP_ITC_EXT.1/MDFCHANNEL</a> to support this objective because when the TOE is a mobile device, it must be required to ensure that MDM Server communications are protected.
	<a href="#">FTP_TRP.1/MDFENROLL</a> (if MDF is Base-PP)	The PP-Module includes <a href="#">FTP_ITC_EXT.1/MDFCHANNEL</a> to support this objective because when the TOE is a mobile device, it must be required to ensure that MDM Server enrollment communications are protected.
	FPT_ITT.1(2) (if MDM is Base-PP)	This SFR is selection-based in the MDM PP but is required when the TOE includes this PP-Module because it is triggered by the MDM Agent being part of the TOE. This SFR supports the objective by defining the trusted channel the TSF must use to secure connectivity between the MDM Server and MDM Agent components of the distributed TOE.
	<a href="#">FPT_NET_EXT.1</a> (objective)	The PP-Module includes <a href="#">FPT_NET_EXT.1</a> to support this objective by optionally requiring the TSF to detect when a sustained communications outage with the MDM Server has occurred as a possible indicator of communications issues.
<a href="#">O.STORAGE</a>	<a href="#">FCS_STG_EXT.1/MDMKEYS</a> (if MDM is Base-PP)	The PP-Module includes <a href="#">FCS_STG_EXT.4</a> to support this objective because when the TOE is a mobile device, ensures that MDM Agent key data is stored securely.
	<a href="#">FCS_STG_EXT.4</a> (if MDF is Base-PP)	The PP-Module includes <a href="#">FCS_STG_EXT.1/MDMKEYS</a> to support this objective because when the TOE is a MDM Server with MDM Agent capability, ensures that MDM Agent key data is stored securely.

# 6 Consistency Rationale

## 6.1 Protection Profile for MDM Agent

### 6.1.1 Consistency of TOE Type

When this PP-Module is used to extend the MDF PP, the TOE type for the overall TOE is still a mobile device. The TOE boundary is simply extended to include the MDM Agent application that runs on the mobile device.

### 6.1.2 Consistency of Security Problem Definition

PP-Module Threat, Assumption, OSP	Consistency Rationale
T.MALICIOUS_APPS	
T.BACKUP	This threat protects user data from unauthorized logical access. An attacker would attempt to exploit this threat by first exploiting the T.PHYSICAL, T.FLAWAPP, or T.PERSISTENT threats defined in the Base-PP against the mobile device as a whole, and then using the device itself as an attack vector against any backup data stored on the TOE.
T.NETWORK_ATTACK	
T.NETWORK_EAVESDROP	
T.PHYSICAL_ACCESS	
A.CONNECTIVITY	This assumption expects that networking services will be available for the TOE to use. This is consistent with the Base-PP because the TOE is installed on a mobile device defined by the Base-PP that provides networking services through various radios.
A.PLATFORM	This assumption expects that the TOE's underlying hardware platform is validated against the MDF PP. This is consistent with the Base-PP by definition because the mobile device is within the TOE boundary and evaluated against the MDF PP.
A.PROPER_ADMIN	This assumption expects that the TOE administrator is trusted and competent in configuring the TSF. This assumption is consistent with the A.CONFIG assumption in the Base-PP which expects the TSF to be configured correctly regardless of the subject performing the configuration.
A.PROPER_USER	This assumption expects that the TOE user is not willfully negligent or hostile in using the TSF. This assumption is consistent with the A.CONFIG assumption in the Base-PP which expects the TSF to be configured correctly regardless of the subject performing the configuration as well as the A.NOTIFY and A.PRECAUTION assumptions which define baseline expectations for the user's level of responsibility.
P.ACCOUNTABILITY	The Base-PP does not define any OSPs so any OSPs defined by the PP-Module will not conflict with the Base-PP by definition.
P.ADMIN	The Base-PP does not define any OSPs so any OSPs defined by the PP-Module will not conflict with the Base-PP by definition.
P.DEVICE_ENROLL	The Base-PP does not define any OSPs so any OSPs defined by the PP-Module will not conflict with the Base-PP by definition.
P.NOTIFY	The Base-PP does not define any OSPs so any OSPs defined by the PP-Module will not conflict with the Base-PP by definition.

### 6.1.3 Consistency of Objectives

The objectives for the TOEs are consistent with the MDM Agent PP based on the following rationale:

PP-Module TOE Objective	Consistency Rationale
O.ACCOUNTABILITY	The Base-PP provides an objective, O.INTEGRITY, that ensures that the integrity of the mobile device is maintained. This objective assists in the implementation of O.INTEGRITY by providing records of administrative activity, which would include actions that could cause the integrity of the mobile device to be lost.
O.APPLY_POLICY	This objective supports the implementation of the O.CONFIG objective

defined in the Base-PP by specifying an additional method by which the TSF may be configured.

**O.DATA\_PROTECTION\_TRANSIT** This objective extends the Base-PP's O.COMMS objective by ensuring that the communications related to MDM Agent functionality are secured in the same manner as other sensitive data transmitted to/from the mobile device.

**O.STORAGE** This objective extends the Base-PP's **O.STORAGE** objective by ensuring that the mobile device's data-at-rest protection mechanisms can also be used to secure the MDM Agent and related data.

The objectives for the TOE's OE are consistent with the MDM Agent PP based on the following rationale:

PP-Module OE Objective	Consistency Rationale
<b>OE.DATA_PROPER_ADMIN</b>	This objective extends the Base-PP's OE.CONFIG objective by expecting that TOE administrators act appropriately when installing or configuring the MDM Agent.
<b>OE.DATA_PROPER_USER</b>	This objective extends the Base-PP's OE.NOTIFY and OE.PRECAUTION objectives by setting reasonable expectations for user security behavior.
<b>OE.IT_ENTERPRISE</b>	This objective helps mitigate the T.EAVESDROP and T.NETWORK threats defined by the Base-PP by reducing the network exposure of the mobile device. This does not conflict with the Base-PP because the Base-PP does not set specific expectations for the level of security that the enterprise provides, but all use cases from the Base-PP set expectations that the mobile device is used for some enterprise purposes so it is reasonable to expect the enterprise have security controls in place to protect these functions.
<b>OE.MOBILE_DEVICE_PLATFORM</b>	This objective is suitable because the MDM Agent can reasonably expect the device it has been deployed on to be secure.
<b>OE.WIRELESS_NETWORK</b>	This objective is suitable because while the Base-PP does not associate any availability metrics with wireless communications, the mobile device will always provide the ability to access a wireless network.

#### 6.1.4 Consistency of Requirements

This PP-Module identifies several SFRs from the MDM Agent PP that are needed to support MDM Agent functionality. This is considered to be consistent because the functionality provided by the MDM Agent PP is being used for its intended purpose. The PP-Module identifies new SFRs that are used entirely to provide functionality for MDM Agent. The rationale for why this does not conflict with the claims defined by the MDM Agent PP are as follows:

PP-Module Requirement	Consistency Rationale
<b>Modified SFRs</b>	
This PP-Module does not modify any requirements when the MDM Agent PP is the base.	
<b>Additional SFRs</b>	
<b>FCS_STG_EXT.4</b>	This SFR requires the MDM Agent to use functionality defined by the Base-PP in FCS_CKM_EXT.1.
<b>FTP_ITC_EXT.1/MDFCHANNEL</b>	The Base-PP defines FTP_ITC_EXT.1 to define the secure protocols used for trusted channel communications. This PP-Module iterates the SFR to specify a subset of these protocols that may be used for MDM Agent communications in particular.
<b>FTP_TRP.1/MDFENROLL</b>	This SFR uses the trusted channel protocols defined by the Base-PP in FTP_ITC_EXT.1 to facilitate a trusted path that the MDM Agent can use to enroll the mobile device it runs on into management. Even though the Base-PP does not define FTP_TRP.1, the requirement was given an iteration label for consistency with the MDM Server requirement of the same name.
<b>Mandatory SFRs</b>	
<b>FAU_ALT_EXT.2</b>	
<b>FAU_GEN.1/AGENT</b>	
<b>FAU_SEL.1/AGENT</b>	



[FIA\\_ENR\\_EXT.2](#)

[FMT\\_POL\\_EXT.2](#)

[FMT\\_SMF\\_EXT.4](#)

[FMT\\_UNR\\_EXT.1](#)

#### Optional SFRs

This PP-Module does not define any Optional requirements.

#### Objective SFRs

[FAU\\_STG\\_EXT.3](#)

[FPT\\_NET\\_EXT.1](#)

#### Implementation-dependent SFRs

This PP-Module does not define any Implementation-dependent requirements.

#### Selection-based SFRs

This PP-Module does not define any Selection-based requirements.

## 6.2 Protection Profile for MDM Agent

### 6.2.1 Consistency of TOE Type

When this PP-Module is used to extend the MDM PP, the TOE type for the overall TOE is still mobile device management. The TOE boundary is simply extended to include the MDM Agent(s) that reside on individual mobile devices and support the management functionality that the MDM Server component implements.

### 6.2.2 Consistency of Security Problem Definition

PP-Module Threat, Assumption, OSP	Consistency Rationale
<a href="#">T.MALICIOUS_APPS</a>	
<a href="#">T.BACKUP</a>	This threat protects user data from unauthorized logical access. If the backup data is stored outside the MDM or the mobile device that it protects, then there is no conflict with the MDM PP since it is a different security boundary. If the backup data is stored either on the MDM or on the protected device, an attacker would attempt to exploit this threat by first exploiting any of the threats that the MDM PP defines ( <a href="#">T.MALICIOUS_APPS</a> , <a href="#">T.NETWORK_ATTACK</a> , <a href="#">T.NETWORK_EAVESDROP</a> , <a href="#">T.PHYSICAL_ACCESS</a> ) depending on where and how the backup data is stored, and then use successful exploitation of one of these threats to attempt to access the backup data itself.
<a href="#">T.NETWORK_ATTACK</a>	
<a href="#">T.NETWORK_EAVESDROP</a>	
<a href="#">T.PHYSICAL_ACCESS</a>	
<a href="#">A.CONNECTIVITY</a>	This assumption expects that networking services will be available for the TOE to use. This is consistent with the Base-PP because the portion of the TOE defined by the Base-PP runs on a general-purpose operating system or specialized network appliance. The Base-PP does not make any assumptions about the environmental functionality that this PP-Module relies on, so there is nothing in this PP-Module that would contradict it.
<a href="#">A.PLATFORM</a>	This assumption expects that the TOE's underlying hardware platform is validated against the MDF PP. This is consistent with the Base-PP because the portion of the TOE defined by the Base-PP runs on a general-purpose operating system or specialized network appliance. The Base-PP does not make any assumptions about the environmental functionality that this PP-Module relies on, so there is nothing in this PP-Module that would contradict it.
<a href="#">A.PROPER_ADMIN</a>	The Base-PP defines an <a href="#">A.PROPER_ADMIN</a> assumption that is identical to the one defined by the PP-Module. The PP-Module just extends it to the entire TOE boundary rather than just the MDM Server.

<a href="#">A.PROPER_USER</a>	The Base-PP defines an <a href="#">A.PROPER_USER</a> assumption that is identical to the one defined by the PP-Module. The PP-Module just extends it to the entire TOE boundary rather than just the MDM Server.
<a href="#">P.ACCOUNTABILITY</a>	The Base-PP defines a <a href="#">P.ACCOUNTABILITY</a> OSP that is identical to the one defined by the PP-Module. The PP-Module just extends it to the entire TOE boundary rather than just the MDM Server.
<a href="#">P.ADMIN</a>	The Base-PP defines a <a href="#">P.ADMIN</a> OSP that is identical to the one defined by the PP-Module. The PP-Module just extends it to the entire TOE boundary rather than just the MDM Server.
<a href="#">P.DEVICE_ENROLL</a>	The Base-PP defines a <a href="#">P.DEVICE_ENROLL</a> OSP that is identical to the one defined by the PP-Module. The PP-Module just extends it to the entire TOE boundary rather than just the MDM Server.
<a href="#">P.NOTIFY</a>	The Base-PP defines a <a href="#">P.NOTIFY</a> OSP that is identical to the one defined by the PP-Module. The PP-Module just extends it to the entire TOE boundary rather than just the MDM Server.

### 6.2.3 Consistency of Objectives

The objectives for the TOEs are consistent with the MDM PP based on the following rationale:

PP-Module TOE Objective	Consistency Rationale
<a href="#">O.ACCOUNTABILITY</a>	The MDM PP contains this same objective with the same purpose.
<a href="#">O.APPLY_POLICY</a>	The MDM PP contains this same objective with the same purpose.
<a href="#">O.DATA_PROTECTION_TRANSIT</a>	The MDM PP contains this same objective with the same purpose.
<a href="#">O.STORAGE</a>	This objective requires the MDM Agent to use platform key storage to protect secret and private key data. The MDM PP defines a requirement for key storage (FCS_STG_EXT.1) that allows the MDM Agent to satisfy this objective.

The objectives for the TOE's OE are consistent with the MDM PP based on the following rationale:

PP-Module OE Objective	Consistency Rationale
<a href="#">OE.DATA_PROPER_ADMIN</a>	The MDM PP contains this same objective with the same purpose.
<a href="#">OE.DATA_PROPER_USER</a>	The MDM PP contains this same objective with the same purpose.
<a href="#">OE.IT_ENTERPRISE</a>	The MDM PP contains this same objective with the same purpose.
<a href="#">OE.MOBILE_DEVICE_PLATFORM</a>	The MDM PP contains this same objective with the same purpose.
<a href="#">OE.WIRELESS_NETWORK</a>	The MDM PP contains this same objective with the same purpose.

### 6.2.4 Consistency of Requirements

This PP-Module identifies several SFRs from the MDM PP that are needed to support MDM Agent functionality. This is considered to be consistent because the functionality provided by the MDM PP is being used for its intended purpose. The PP-Module identifies new SFRs that are used entirely to provide functionality for MDM Agent. The rationale for why this does not conflict with the claims defined by the MDM PP are as follows:

PP-Module Requirement	Consistency Rationale
<b>Modified SFRs</b>	
This PP-Module does not modify any requirements when the MDM PP is the base.	
<b>Additional SFRs</b>	
<a href="#">FCS_STG_EXT.1/MDMKEYS</a>	The Base-PP requires the TOE to define a method of key storage. This PP-Module iterates it to specify the use of platform key storage for MDM Agents.
<b>Mandatory SFRs</b>	
<a href="#">FAU_ALT_EXT.2</a>	
<a href="#">FAU_GEN.1/AGENT</a>	
<a href="#">FAU_SEL.1/AGENT</a>	



FIA\_ENR\_EXT.2

FMT\_POL\_EXT.2

FMT\_SMF\_EXT.4

FMT\_UNR\_EXT.1

#### **Optional SFRs**

This PP-Module does not define any Optional requirements.

#### **Objective SFRs**

FAU\_STG\_EXT.3

FPT\_NET\_EXT.1

#### **Implementation-dependent SFRs**

This PP-Module does not define any Implementation-dependent requirements.

#### **Selection-based SFRs**

This PP-Module does not define any Selection-based requirements.

# Appendix A - Optional SFRs

## A.1 Strictly Optional Requirements

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This PP-Module does not define any Strictly Optional SFRs.

## A.2 Objective Requirements

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### A.2.1 Security Audit (FAU)

#### FAU\_STG\_EXT.3 Security Audit Event Storage

FAU\_STG\_EXT.3.1

The MDM Agent shall store MDM audit records in the platform-provided audit storage.

**Application Note:** [FAU\\_STG\\_EXT.3](#) should only be included in the ST for MDM Agent platforms (i.e., mobile devices) that conform to MDF PP version 3 or later.

### A.2.2 Protection of the TSF (FPT)

#### FPT\_NET\_EXT.1 Network Reachability

FPT\_NET\_EXT.1.1

The TSF shall detect when a configurable [**selection:** *positive integer of missed reachability events occur, time limit is exceeded* ] related to the last successful connection with the server has been reached.

**Application Note:** This requirement is to enable the Agent to determine if it has been out of connectivity with the Server for too long. The configuration of the number of allowed missed reachability events or time limit since last successful connection with the server is handled in Server configuration policy of the Agent (the first selection of function 56 in FMT\_SMF.1.1(1) within the MDM PP). If the first selection of FMT\_SMF.1.1(1) function 56 is included in the ST, then [FPT\\_NET\\_EXT.1.1](#) must be included in the ST.

If the Agent has been out of connectivity with the server for too long than the remediation actions specified in the second selection of function 56 must occur. For example if the Agent has not synced with the server in the allowed amount of time that the Agent must wipe the device without requiring a command from the Server.

## A.3 Implementation-dependent Requirements

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This PP-Module does not define any Implementation-dependent SFRs.

# Appendix B - Selection-based Requirements

This PP-Module does not define any Selection-based SFRs.

# Appendix C - Extended Component Definitions

This appendix contains the definitions for all extended requirements specified in the PP-Module.

## C.1 Extended Components Table

All extended components specified in the PP-Module are listed in this table:

Table 3: Extended Component Definitions

Functional Class	Functional Components
Cryptographic Support (FCS)	FCS_STG_EXT Trusted Channel
Identification and Authentication (FIA)	FIA_ENR_EXT Enrollment
Protection of the TSF (FPT)	FPT_NET_EXT Network Reachability
Security Audit (FAU)	FAU_ALT_EXT MDM Alerts FAU_STG_EXT Protected Audit Event Storage
Security Management (FMT)	FMT_POL_EXT Trusted Policy Update FMT_SMF_EXT Specification of Management Functions (Agent) FMT_UNR_EXT Unenrollment

## C.2 Extended Component Definitions

### C.2.1 Cryptographic Support (FCS)

This PP-Module defines the following extended components as part of the FCS class originally defined by CC Part 2:

#### C.2.1.1 FCS\_STG\_EXT Trusted Channel

This family is defined in both the MDF and the MDM Base-PPs. This PP-Module augments the extended family by adding one additional component, [FCS\\_STG\\_EXT.4](#). This new component and its impact on the extended family’s component leveling are shown below; reference the MDF or MDM PP for all other definitions for this family.

[FCS\\_STG\\_EXT.4](#), Cryptographic Key Storage, requires the TSF to define a specific location for its key storage.

#### Management: FCS\_STG\_EXT.4

There are no management functions foreseen.

#### Audit: FCS\_STG\_EXT.4

There are no auditable events foreseen.

#### FCS\_STG\_EXT.4 Cryptographic Key Storage

Hierarchical to: No other components.

Dependencies to: FCS\_CKM.1 Cryptographic Key Generation

#### FCS\_STG\_EXT.4.1

The MDM Agent shall use the platform provided key storage for all persistent secret and private keys.

### C.2.2 Identification and Authentication (FIA)

This PP-Module defines the following extended components as part of the FIA class originally defined by CC Part 2:

#### C.2.2.1 FIA\_ENR\_EXT Enrollment

This family is defined in the MDM Base-PP. This PP-Module augments the extended family by adding one additional component, [FIA\\_ENR\\_EXT.2](#). This new component and its impact on the extended family’s component leveling are shown below; reference the MDM PP for all other definitions for this family.

[FIA\\_ENR\\_EXT.2](#), Agent Enrollment of Mobile Device into Management, requires the TSF to record specific information about the MDM Server (i.e. the entity that is enrolling it) during the enrollment process.

#### Management: FIA\_ENR\_EXT.2

There are no management functions foreseen.

#### **Audit: FIA\_ENR\_EXT.2**

The following actions should be auditable if FAU\_GEN Security audit data generation is included in the PP/ST:

- Minimal: Completion of enrollment process.

#### **FIA\_ENR\_EXT.2 Agent Enrollment of Mobile Device into Management**

Hierarchical to: No other components.

Dependencies to: FIA\_ENR\_EXT.1 Enrollment of Mobile Device into Management

##### **FIA\_ENR\_EXT.2.1**

The MDM Agent shall record the reference identifier of the MDM Server during the enrollment process.

### **C.2.3 Protection of the TSF (FPT)**

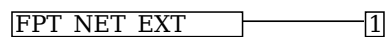
This PP-Module defines the following extended components as part of the FPT class originally defined by CC Part 2:

#### **C.2.3.1 FPT\_NET\_EXT Network Reachability**

##### **Family Behavior**

Components in this family define requirements for tracking the availability of network components.

##### **Component Leveling**



[FPT\\_NET\\_EXT.1](#), Network Reachability, requires the TSF to keep track of failed attempts to communicate with a remote entity.

##### **Management: FPT\_NET\_EXT.1**

The following actions could be considered for the management functions in FMT:

- Configuration of unreachability threshold.

##### **Audit: FPT\_NET\_EXT.1**

The following actions should be auditable if FAU\_GEN Security audit data generation is included in the PP/ST:

- Minimal: Reaching/exceeding unreachability threshold.

#### **FPT\_NET\_EXT.1 Network Reachability**

Hierarchical to: No other components.

Dependencies to: FPT\_STM.1 Reliable Time Stamps

##### **FPT\_NET\_EXT.1.1**

The TSF shall detect when a configurable [**selection:** *positive integer of missed reachability events occur, time limit is exceeded* ] related to the last successful connection with the server has been reached.

### **C.2.4 Security Audit (FAU)**

This PP-Module defines the following extended components as part of the FAU class originally defined by CC Part 2:

#### **C.2.4.1 FAU\_ALT\_EXT MDM Alerts**

This family is defined in the MDM Base-PP. This PP-Module augments the extended family by adding one additional component, [FAU\\_ALT\\_EXT.2](#). This new component and its impact on the extended family's component leveling are shown below; reference the MDM PP for all other definitions for this family.

[FAU\\_ALT\\_EXT.2](#), Agent Alerts, requires the TSF to define when and how an MDM Agent generates alerts and transmits them to an MDM Server based on its activity.

##### **Management: FAU\_ALT\_EXT.2**

The following actions could be considered for the management functions in FMT:

- Ability to configure the specific events that result in generation of alerts.

## **Audit: FAU\_ALT\_EXT.2**

The following actions should be auditable if FAU\_GEN Security audit data generation is included in the PP/ST:

- Minimal: Success/failure of sending alert.

## **FAU\_ALT\_EXT.2 Agent Alerts**

Hierarchical to: No other components.

Dependencies to: FAU\_ALT\_EXT.1 Server Alerts  
[FPT\_ITT.1 Basic Internal TSF Data Transfer Protection; or  
FTP\_ITC.1 Inter-TSF Trusted Channel]

### **FAU\_ALT\_EXT.2.1**

The MDM Agent shall provide an alert via the trusted channel to the MDM Server in the event of any of the following audit events:

- successful application of policies to a mobile device,
- **[selection: receiving, generating ]** periodic reachability events,
- **[selection:**
  - *change in enrollment state*
  - *failure to install an application from the MAS Server*
  - *failure to update an application from the MAS Server*
  - **[assignment: other events]**
  - *no other events*

].

### **FAU\_ALT\_EXT.2.2**

The MDM Agent shall queue alerts if the trusted channel is not available.

## **C.2.4.2 FAU\_STG\_EXT Protected Audit Event Storage**

This family is defined in the MDM Base-PP. This PP-Module augments the extended family by adding one additional component, [FAU\\_STG\\_EXT.3](#). This new component and its impact on the extended family's component leveling are shown below; reference the MDM PP for all other definitions for this family.

[FAU\\_STG\\_EXT.3](#), Security Audit Event Storage, requires the TSF to identify a location for audit record storage and the events that are stored at this location.

### **Management: FAU\_STG\_EXT.3**

There are no management functions foreseen.

### **Audit: FAU\_STG\_EXT.3**

There are no auditable events foreseen.

## **FAU\_STG\_EXT.3 Security Audit Event Storage**

Hierarchical to: No other components.

Dependencies to: FAU\_GEN.1 Audit Data Generation

### **FAU\_STG\_EXT.3.1**

The MDM Agent shall store MDM audit records in the platform-provided audit storage.

## **C.2.5 Security Management (FMT)**

This PP-Module defines the following extended components as part of the FMT class originally defined by CC Part 2:

### **C.2.5.1 FMT\_POL\_EXT Trusted Policy Update**

This family is defined in the MDM Base-PP. This PP-Module augments the extended family by adding one additional component, [FMT\\_POL\\_EXT.2](#). This new component and its impact on the extended family's component leveling are shown below; reference the MDM PP for all other definitions for this family.

[FMT\\_POL\\_EXT.2](#), Agent Trusted Policy Update, requires the TSF to verify the validity of the source of a policy before applying it.

### **Management: FMT\_POL\_EXT.2**

There are no management functions foreseen.

## Audit: FMT\_POL\_EXT.2

The following actions should be auditable if FAU\_GEN Security audit data generation is included in the PP/ST:

- Minimal: Failure to validate policy.

## FMT\_POL\_EXT.2 Agent Trusted Policy Update

Hierarchical to: No other components.

Dependencies to: FCS\_COP.1 Cryptographic Operation  
FMT\_POL\_EXT.1 Trusted Policy Update

### FMT\_POL\_EXT.2.1

The MDM Agent shall only accept policies and policy updates that are digitally signed by a private key that has been authorized for policy updates by the MDM Server.

### FMT\_POL\_EXT.2.2

The MDM Agent shall not install policies if the signature check fails.

## C.2.5.2 FMT\_SMF\_EXT Specification of Management Functions (Agent)

This family is defined in the MDF Base-PP. This PP-Module augments the extended family by adding one additional component, [FMT\\_SMF\\_EXT.4](#). This new component and its impact on the extended family's component leveling are shown below; reference the MDF PP for all other definitions for this family.

[FMT\\_SMF\\_EXT.4](#), Specification of Management Functions, requires the TSF to support the execution of certain management functions that require interfacing with other TOE components.

### Management: FMT\_SMF\_EXT.4

The following actions could be considered for the management functions in FMT:

- Execution of management functions.
- Configuration of management functions behavior.

## Audit: FMT\_SMF\_EXT.4

The following actions should be auditable if FAU\_GEN Security audit data generation is included in the PP/ST:

- Minimal: Successful and failed execution of management functions.

## FMT\_SMF\_EXT.4 Specification of Management Functions

Hierarchical to: No other components.

Dependencies to: FCS\_CKM.1 Cryptographic Key Generation

### FMT\_SMF\_EXT.4.1

The MDM Agent shall be capable of interacting with the platform to perform the following functions:

- [**selection:** *Import the certificates to be used for authentication of MDM Agent communications, Import the server public key* ],
- [**selection:** *administrator-provided management functions in MDF PP, administrator-provided device management functions in MDM PP* ]
- [**selection:** [**assignment:** *additional functions*], *no additional functions* ].

### FMT\_SMF\_EXT.4.2

The MDM Agent shall be capable of performing the following functions:

- Enroll in management
- Configure whether users can unenroll from management
- [**selection:** *configure periodicity of reachability events*, [**assignment:** *other management functions*], *no other functions* ].

## C.2.5.3 FMT\_UNR\_EXT Unenrollment

### Family Behavior

Components in this family define requirements for TSF behavior when a user attempts to unenroll the TOE from mobile device management.

### Component Leveling

[FMT\\_UNR\\_EXT.1](#), User Unenrollment Prevention, requires the TSF either to prevent unenrollment entirely or to take some corrective action in the event that an unenrollment is initiated.

**Management: FMT\_UNR\_EXT.1**

There are no management functions foreseen.

**Audit: FMT\_UNR\_EXT.1**

The following actions should be auditable if FAU\_GEN Security audit data generation is included in the PP/ST:

- Minimal: Unenrollment from MDM.

**FMT\_UNR\_EXT.1 User Unenrollment Prevention**

Hierarchical to: No other components.

Dependencies to: [FIA\_ENR\_EXT.1 Enrollment of Mobile Device into Management; or  
FMT\_MOF\_EXT.1 Management of Functions Behavior]

**FMT\_UNR\_EXT.1.1**

The MDM Agent shall provide a mechanism to enforce the following behavior upon an attempt to unenroll the mobile device from management: [**selection:** *prevent the unenrollment from occurring, apply remediation actions* ].



# Appendix D - Implicitly Satisfied Requirements

This appendix lists requirements that should be considered satisfied by products successfully evaluated against this PP-Module. These requirements are not featured explicitly as SFRs and should not be included in the ST. They are not included as standalone SFRs because it would increase the time, cost, and complexity of evaluation. This approach is permitted by [\[CC\]](#) Part 1, 8.2 Dependencies between components.

This information benefits systems engineering activities which call for inclusion of particular security controls. Evaluation against the PP-Module provides evidence that these controls are present and have been evaluated.

FPT\_STM.1 - Reliable Time Stamps

Requirement	Rationale for Satisfaction
FMT_MTD.1 - Management of TSF Data	<p>FAU_SEL.1 has a dependency on FMT_MTD.1 because the configuration settings that determine what events are audited is considered to be TSF data. While FAU_SEL.1 determines the extent to which the TOE's audit function is configured, it relies on FMT_MTD.1 to determine the administrative roles that are permitted to manipulate this data.</p> <p>This is not applicable to the PP-Module because there is no management interface for a TOE user to interact with; instead, all management functions are initiated by an MDM Server and performed by the MDM Agent which has sufficient privileges on the underlying device to do this. In this case, <a href="#">FIA_ENR_EXT.2</a> and <a href="#">FMT_POL_EXT.1</a> are sufficient to validate that the source of the policy data is identified and authenticated before the policy change is accepted. It is not necessary to define a management role associated with this function because the MDM Server does not need to assume a 'role' on the TOE to communicate policy data; it is sufficient for the TSF to determine the policy is genuine.</p>
No matter what Base-PP is claimed for the TOE, the MDM Agent itself will be installed on a device. If the underlying device is part of the TOE, the dependency is satisfied by FPT_STM.1 if the MDF PP is the Base-PP, FPT_STM.1 is implicitly satisfied per Appendix D of the GPOS PP if that is the Base-PP. If the device is not part of the TOE (i.e. because the Base-PP is the MDM PP), a reliable time source can still be assumed because all mobile devices must include some method to update time data from a cellular carrier network, and can also reasonably be assumed to include a method to update network time if it is instead connected to a network via WLAN radio (such as when in airplane mode) and general-purpose operating systems are also assumed to have network time interfaces.	

# Appendix E - Acronyms

Acronym	Meaning
API	Application Programming Interface
Base-PP	Base Protection Profile
BYOD	Bring Your Own Device
CC	Common Criteria
CEM	Common Evaluation Methodology
COPE	Corporately Owned, Personally Enabled
cPP	Collaborative Protection Profile
DN	Distinguished Name
DTLS	Datagram Transport Layer Security
EP	Extended Package
FP	Functional Package
GPOS	General Purpose Operating System
HTTPS	HyperText Transfer Protocol Secure
IP	Internet Protocol
IPSec	Internet Protocol Security
MAS	Mobile Application Store
MD	Mobile Device
MDF	Mobile Device Fundamentals
MDM	Mobile Device Management
OE	Operational Environment
PP	Protection Profile
PP-Configuration	Protection Profile Configuration
PP-Module	Protection Profile Module
RBG	Random Bit Generation
SAR	Security Assurance Requirement
SD	Supporting Document
SFR	Security Functional Requirement
ST	Security Target
ST	Security Target
TLS	Transport Layer Security
TOE	Target of Evaluation
TSF	TOE Security Functionality
TSFI	TSF Interface
TSS	TOE Summary Specification
VPN	Virtual Private Network
WiFi	Wireless Fidelity

# Appendix F - Bibliography

Identifier	Title
[CC]	<div>Common Criteria for Information Technology Security Evaluation -<ul style="list-style-type: none"><li>Part 1: Introduction and General Model, CCMB-2017-04-001, Version 3.1 Revision 5, April 2017.</li><li>Part 2: Security Functional Components, CCMB-2017-04-002, Version 3.1 Revision 5, April 2017.</li><li>Part 3: Security Assurance Components, CCMB-2017-04-003, Version 3.1 Revision 5, April 2017.</li></ul></div>