

Workspace ONE mobile flows

VMware Workspace ONE UEM 1907



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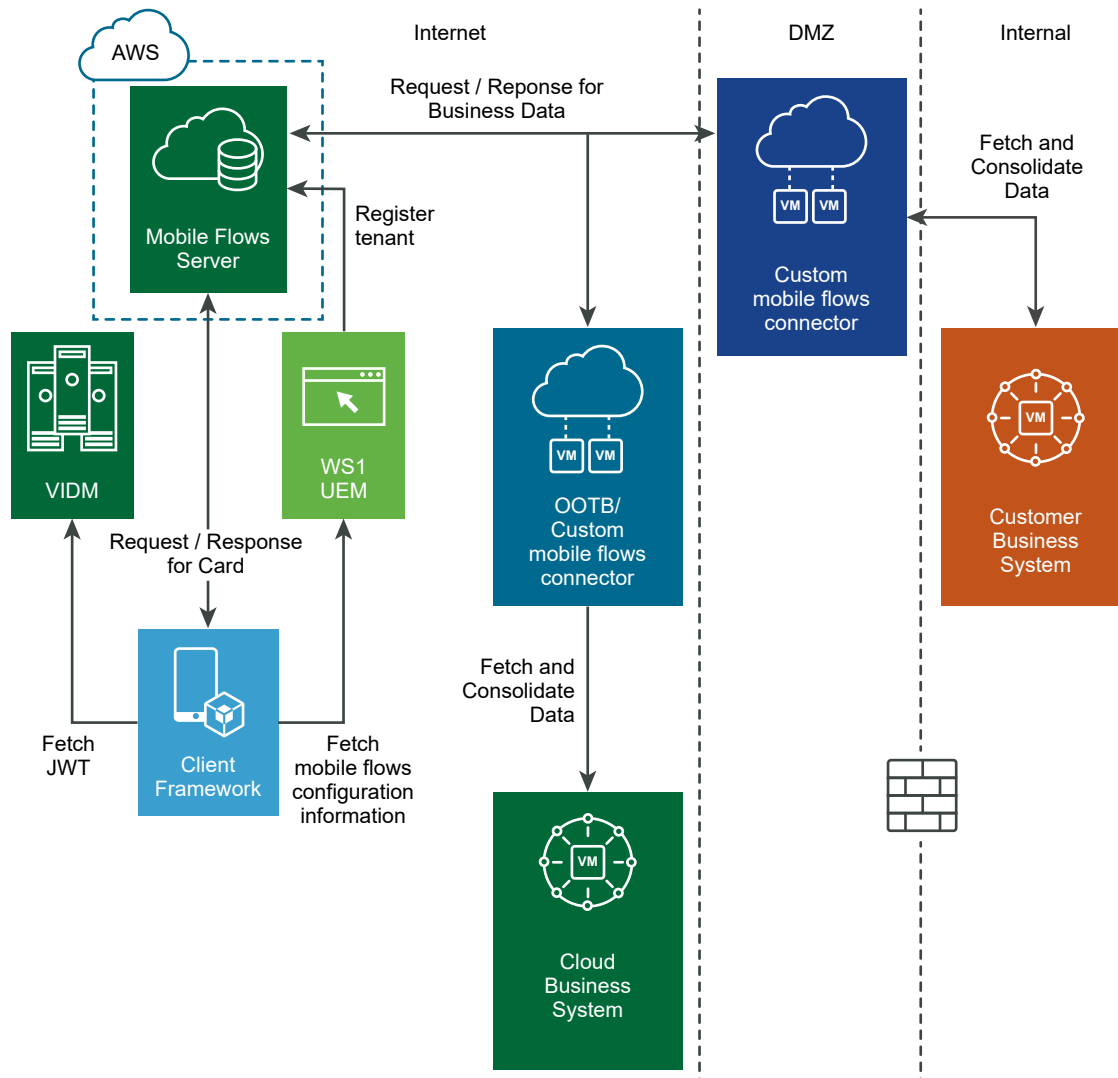
Introduction to Workspace ONE mobile flows

1

Mobile flows is a framework designed for enterprise companies to bring the micro applications on their employees devices to surface contextual information and perform actions on various business systems. It helps the device users to perform tasks across multiple business backend systems within VMware applications enabling users to be more productive while maintaining enterprise security and organization compliance regulations on the cloud and on the edge. Mobile flows eliminates the need to visit multiple websites to perform different business tasks. Provides user-specific micro applications that streamline the data flow such as quick data entry, data retrieval, approvals, and making business decisions.

Architectural Overview

Figure 1-1. mobile flows Architecture



Components of mobile flows

The mobile flows architecture has three primary components:

- The mobile flows server - Is the heart of the entire system that is responsible for logic, connector discovery, and returning data to the requesting client.
- The connector - Is used to connect to the business system, request the data, perform the interactions as requested by the client, and contains the logic for how the card must appear on the client. For example, a Salesforce card might be displayed in the Workspace ONE Boxer application where users

can see important information and also take required action on Salesforce right from the mobile flow card. You can create your own connectors or customize the open source pre-built connectors. You can also use the out-of-the-box (OOTB) connectors such as Salesforce and ServiceNow which are hosted on the VMware's servers.

- The client-side framework - Is responsible for rendering the card on the client to display the contextual information, along with the required input to take the required action.

Use Cases

You can build connectors to address a variety of needs within an organization. You can provide different types of notifications, bring up contextual cards within the Workspace ONE Boxer application, or make actions available to users to perform operations from the Workspace ONE Intelligent Hub.

See [Use Cases](#) for more information.

This chapter includes the following topics:

- [Hardware, Software, and Network Requirements](#)

Hardware, Software, and Network Requirements

You must meet the hardware and network requirements detailed in this section before configuring VMware Workspace ONE mobile flows with VMware Workspace ONE Boxer or Workspace ONE Intelligent Hub.

Software Requirements

The following list describes the software requirements for configuring VMware Workspace ONE mobile flows with VMware Workspace ONE Boxer:

- AirWatch console 9.3 or later, Workspace ONE UEM console v1810 or later
- Workspace ONE UEM console 1902 for Out-of-the-Box(OOTB) connectors
- VMware Boxer v4.12 or later
- VMware Identity Manager v3.1 or later
- Workspace ONE Enterprise bundle or mobile flows add-on

The following list describes the software requirements for configuring VMware Workspace ONE mobile flows with Workspace ONE Intelligent Hub:

- Workspace ONE Intelligent Hub version 1810 or later
- Workspace ONE UEM console version 1904 or later
- VMware Identity Manager cloud services
- mobile flows cloud services

Hardware Requirements

The hardware requirements listed below are applicable if you want to use custom connectors that customers can build and deploy on their infrastructure or cloud.

Number of Devices	Up to 40,000	40,000 - 80,000	80,000 - 120,000	120,000 - 160,000
Number of Servers	2	3	4	5
CPU Cores	4 CPU cores	4 CPU cores each	4 CPU cores each	4 CPU cores each
RAM (GB)	8	8	8	8
Hard Disk Space	<ul style="list-style-type: none"> ■ 10 GB for Linux Distribution ■ 400 MB for installer ■ 10 GB for log files 			

Network Requirements

Source	Destination	Port
mobile flows server - https://prod.hero.vmwservices.com	mobile flows Connector	443 (inbound)
mobile flows Connector	Backend Business Systems	443
Workspace ONE UEM console	mobile flows server - https://prod.hero.vmwservices.com	443

Configuring VMware Workspace ONE mobile flows

2

You must first configure the VMware Identity Manager for mobile flows before configuring VMware Workspace ONE mobile flows. You can then create, configure, and add pre-built, custom, or OOTB connectors to your mobile workflows.

This chapter includes the following topics:

- [Workspace ONE mobile flows Connectors](#)
- [Configure the VMware Identity Manager Template](#)
- [Register the Customer Tenant to the mobile flows Cloud Service](#)
- [Configure Connectors from Workspace ONE UEM console](#)
- [Add Out-of-the-Box \(OOTB\) Connectors](#)
- [List of Pre-built Connectors](#)

Workspace ONE mobile flows Connectors

Connectors are services or components that work with the mobile flows server. Connectors can be configured to fetch user-specific information that enables mobile flows to work on the configured user devices.

The connectors fetch user-specific information from the business systems that are behind an organization's internal firewall and send responses back to the user's mobile application. The connectors are specific to each business system. For example, you have to configure and deploy a Salesforce connector if you want to fetch information from a Salesforce business system and respond to a mobile flows request.

Use Cases

There are a number of ways that you can use VMware Workspace ONE mobile flows to build contextual cards, actions, and notifications.

Notifications

Notifications helps users stay up-to-date with new and relevant activities that are happening within their organizations, and be notified of tasks or jobs might require their immediate action. You can see the open and pending approval requests under the hub notification section which will enable users to view and take action from the hub application.

There are two types of notifications:

- Informational notification - Provide notification which contain information about possible business opportunities, or follow up on contacts, for example.
- Action Notification - Notify about new activities with relevant information and based on the notification, users may or may not have to take appropriate actions to business systems.

The following example adds an Action Card to the Workspace ONE Intelligent Hub about an expense report:

```
{
  "objects": [
    {
      "actions": [
        {
          "action_key": "USER_INPUT",
          "allow_repeated": false,
          "completed_label": "Approved",
          "id": "00000000-0000-0000-0000-000000000000",
          "label": "Approve",
          "mutually_exclusive_set_id": "approval-actions",
          "primary": true,
          "request": {},
          "type": "POST",
          "url": {
            "href": "https://hero/connectors/concur/api/expense/1D3BD2E14D144508B05F/approve"
          },
          "user_input": [
            {
              "format": "textarea",
              "id": "comment",
              "label": "Comment"
            }
          ]
        },
        {
          "action_key": "USER_INPUT",
          "allow_repeated": false,
          "completed_label": "Declined",
          "id": "00000000-0000-0000-0000-000000000000",
          "label": "Decline",
          "mutually_exclusive_set_id": "approval-actions",
          "request": {},
          "type": "POST",
          "url": {
            "href": "https://hero/connectors/concur/api/expense/1D3BD2E14D144508B05F/decline"
          },
          "user_input": [
            {
              "format": "textarea",
              "id": "reason",
              "label": "Reason"
            }
          ]
        }
      ]
    }
  ]
}
```

```

    ],
    "body": {
      "fields": [
        {
          "description": "1970-01-01T00:00:00Z",
          "title": "Submitted On",
          "type": "GENERAL"
        },
        {
          "description": "Totla, Gaurav",
          "title": "Requested By",
          "type": "GENERAL"
        },
        {
          "description": "(IN1019722)IT - Apps Cloud-1021",
          "title": "Cost Center",
          "type": "GENERAL"
        },
        {
          "description": "$23,340.21",
          "title": "Amount",
          "type": "GENERAL"
        }
      ],
      "creation_date": "1970-01-01T00:00:00Z",
      "hash": "test-hash",
      "header": {
        "title": "Meals & Entertainment"
      },
      "id": "00000000-0000-0000-0000-000000000000",
      "image": { "href": https://s3.amazonaws.com/vmw-mf-assets/connector-images/hub-concur.png }
    }
  ]
}

```

Note The approve and decline action links provided in the example are for your reference only.

Contextual Cards

Contextual cards can be informational cards or action cards that can be surfaced within the Workspace ONE Boxer application to help users consume more relevant and important information and help increase employee engagement.

Contextual cards may or may not have actions depending on the context. For example, when an email is received, based on the context of the email content, a card request is triggered.

The following declaration adds an Action Card to the Workspace ONE Boxer application about an expense report:

```

{
  "objects": [
    {
      "actions": [
        {
          "action_key": "USER_INPUT",

```

```

        "allow_repeated": false,
        "completed_label": "Approved",
        "id": "00000000-0000-0000-0000-000000000000",
        "label": "Approve",
        "mutually_exclusive_set_id": "approval-actions",
        "primary": true,
        "request": {},
        "type": "POST",
        "url": {
            "href": "https://hero/connectors/concur/api/expense/1D3BD2E14D144508B05F/approve"
        },
        "user_input": [
            {
                "format": "textarea",
                "id": "comment",
                "label": "Comment"
            }
        ]
    },
    {
        "action_key": "USER_INPUT",
        "allow_repeated": false,
        "completed_label": "Declined",
        "id": "00000000-0000-0000-0000-000000000000",
        "label": "Decline",
        "mutually_exclusive_set_id": "approval-actions",
        "request": {},
        "type": "POST",
        "url": {
            "href": "https://hero/connectors/concur/api/expense/1D3BD2E14D144508B05F/
decline"
        },
        "user_input":
    [
        {
            "format": "textarea",
            "id": "reason",
            "label": "Reason"
        }
    ]
    },
    "body": {
        "fields": [
            {
                "description": "1970-01-01T00:00:00Z",
                "title": "Submitted On",
                "type": "GENERAL"
            },
            {
                "description": "Totla, Gaurav",
                "title": "Requested By",
                "type": "GENERAL"
            },
            {
                "description": "(IN1019722)IT - Apps Cloud-1021",
                "title": "Cost Center",
                "type": "GENERAL"
            }
        ]
    }
}

```

```

    },
    {
      "description": "$23,340.21",
      "title": "Amount",
      "type": "GENERAL"
    }
  ],
  "creation_date": "1970-01-01T00:00:00Z",
  "hash": "test-hash",
  "header": {
    "title": "Meals & Entertainment"
  },
  "id": "00000000-0000-0000-0000-000000000000",
  "image": {
    "href": "https://s3.amazonaws.com/vmw-mf-assets/connector-images/hub-concur.png"
  }
}
]
}

```

Note The approve and decline action links provided in the example are for your reference only.

Create Custom Workspace ONE mobile flows Connectors

The mobile flows connectors can be customized as per your requirement.

Workspace ONE mobile flows Connector Framework

You can create or add a connector in one the following ways:

- Use the pre-built connectors developed by VMware to meet specific use cases. These connectors are open-sourced and available on GitHub. See [List of Pre-built Connectors](#).
- Create custom connectors. The connector framework developed by VMware can be utilized to build mobile flows connectors to meet any use cases, and to support any backend business systems that utilizes RESTful APIs.
- Add Out-of-the box (OOTB) connectors. See [Add Out-of-the-Box \(OOTB\) Connectors](#).

For more information on building and installing custom connectors, go to <https://github.com/vmware/connectors-workspace-one>.

Building a Connector

You can use the available OOTB connectors or build your own connector. All communication with a connector is over HTTPS. A connector can be written in any language that allows the developer to create HTTP endpoints.

The instructions below provide an overview of the steps you need to follow to build a connector. For information on configuring the connectors from the console, see [Configure Connectors from Workspace ONE UEM console](#).

- 1 Add a Discovery API - A connector is registered with Mobile Flows Server by adding a discovery URL. This URL might point to the connector itself, or it might point to static web content (for example, Amazon S3). Discovery tells Mobile Flows Server where to submit object requests, etc. The content behind the discovery is JSON and its

Content-Type

should be set to

application/json

. Links in discovery served to the Mobile Flows Server must be externally accessible (the Mobile Flows Server must be able to call into the links returned when calling discovery). A common pattern is to be behind a proxy that will fill in X-Forwarded headers that will enable you construct an external URL.

Note Discovery resources must be available to unauthenticated clients.

- 2 Add a Card Request API to the connector - When a client requests a card, this API is called and a card is requested consists of one or more tokens. These tokens might be pulled from the text of an email (trigger-based card), or they might be from the client's environment, for example, the user's email address.
- 3 Return the card response to the client.
- 4 Add support for card actions to business systems

Examples of OOTB connectors are available on Github at <https://github.com/vmware/connectors-workspace-one/tree/master/connectors>.

Running the Connector

The Workspace ONE Mobile Flows Connectors can be used as it is or they can also be used as a base from which you can develop your own connectors. These connectors can be built, installed, and run as Docker containers, RPM, or Fat Jars.

As a prerequisite, you must have the Docker container platform to build and run the connector.

This section provides the example of running a Jira connector as a Docker container.

```
docker run --name jira-connector \
-p 8080:8080 \ -d \
ws1connectors/jira-connector \
--server.port=8080 \
--security.oauth2.resource.jwt.key-uri="https://xxxx.xxxx.xxxx.com/security/public-key"
```

For information about building and running a connector as RPM or Fat Jar, go to <https://github.com/vmware/connectors-workspace-one#docker>.

Configure the VMware Identity Manager Template

You must configure the VMware Identity Manager template as a first step before configuring mobile flows.

VMware Identity Manager can be used to authenticate the information transfer when using connectors for client applications. If your environment consists of VMware Identity Manager, you can create a VMware Identity Manager template to fetch user specific JWT token for connector authentication.

See the *VMware Identity Manager Connector Installation and Configuration* guide for information.

Procedure

- 1 Log in to the VMware Identity Manager Console and navigate to **Catalog > Settings > Remote App Access > Templates**.
- 2 Select **Create Template**.
- 3 Select **Template ID** and enter `HeroCard_Template1`.

Note The Template ID is hardcoded and cannot be changed as of now. The value must be `HeroCard_Template1`.

- 4 Select **Application** and enter **Identity Manager**.
- 5 Select **Scope** and enter **ENABLE email, profile, user, openid**.
- 6 Select **Redirect URL** and enter **com.airwatch.herocard://success** as the registered redirect URL.
- 7 Select **Token Type** and select **Bearer**.

This attribute tells the application what type of access token it was given. For VMware Identity Manager, the tokens are bearer tokens.

- 8 Select **Token Length** and retain the default setting of 32 bytes.
- 9 Select **Issue Refresh Token** and select **Enabled** to use refresh tokens.
- 10 Select **Access Token TTL** and enter **30 days** as the access token time to live length.

When the access token expires, the application uses the refresh token to request a new access token.

- 11 Select **Refresh Token TTL** and enter **365 days** as the refresh token time to live.
- 12 Select **Add**.

VMware Identity Manager creates a customer tenant in the mobile flows server.

What to do next

From the Workspace ONE UEM console, register the tenant in the mobile flows server.

Register the Customer Tenant to the mobile flows Cloud Service

After configuring the VMware Identity Manager template, you must register the tenant in the mobile flows server to connect to the mobile flows Cloud Service.

Navigate to **Mobile Flows** from the Workspace ONE UEM console and click **Begin** to register the tenant.

After the tenant is registered, you can configure the connectors.

Configure Connectors from Workspace ONE UEM console

Configure the connector details from the console such as the connector name, public facing URI, and authentication type.

Prerequisites

You must have completed the following actions before you can configure the mobile flows connectors from the console:

- 1 Check with your account manager to purchase the VMware Workspace ONE mobile flows add-on. The **Mobile Flows** option is visible in the **Content** page only after you have purchased the add-on.
- 2 Configure the VMware Identity Manager template. See [Configure the VMware Identity Manager Template](#).
- 3 Provision customer tenant (vIDM) to mobile flows Cloud service.
- 4 If you are configuring a connector with a service account authentication, you must know the service account credentials.

Procedure

- 1 Log in to the UEM console and navigate to **Content > Mobile Flows > My Flows** tab.
- 2 Select **New** to create a new connector configuration or **Edit** to edit an existing connector configuration.
The Edit Connector page opens.
- 3 Select the **Name** text box and enter the name of the connector that you want to be displayed on the console and the user's device.
- 4 Select the **Discovery URL** text box and enter the public facing URL for the connector that is deployed within your environment.
- 5 (Optional) Enter the **Base URL**.
The Base URL can be omitted depending on the connector being configured. For example, the base URL may be hardcoded at the customer's connector itself.
- 6 Ensure that the **Activate** slider is set to On.

- 7 (Optional) Select a label from the list of available categories under **Category** to categorize the connector.

The label is used for informational purposes. For example, you can choose Workspace ONE Boxer to indicate that this connector can be made available for the Boxer app.

- 8 Select the authentication type from the **Authentication Type** drop-down menu.

The following different authentication types are available when the connector is enabled:

- Service Account - Enter the service account credentials that the backend service is expecting the client to use.
- Basic - User must enter their credentials.
- OAuth 2.0 - User grants access when prompted on-screen.
- Workspace ONE - No action required.

- 9 Select **Save**.

What to do next

Once the mobile application fetches the connector details, the device users are provided with an option to enable or disable the mobile flows connectors from within the application.

Add Out-of-the-Box (OOTB) Connectors

Out-of-the-box (OOTB) connectors are connector templates with pre-configured information that you can add directly to your mobile applications workflow.

Prerequisites

You must have Workspace ONE UEM console version 1902 or later to use OOTB connectors.

Procedure

- 1 Log in to the UEM console and navigate to **Content > Mobile Flows**.
- 2 Click the **Catalog** tab to see the available OOTB connectors.
- 3 Select the connector you want to add and click **Add**.
- 4 (Optional) Edit the information in the Add *Connector* Flow window.

The connectors are tagged with labels such as Approvals, Catalog, and Workspace ONE Hub. This is for informational purpose, and you can edit the labels under the Category field.

- 5 Click **Save**.

The connector is added to **My Flows**. Click the **My Flows** tab to confirm.

Once the OOTB connector has been enabled and added to your **My Flows**, it will become visible on the Boxer client application.

List of OOTB Connectors

The Out-of-the-box (OOTB) connectors are available on Github.

The OOTB connectors provide the following advantages over the pre-built connectors:

- The configuration information is already added to the connector.
- The connectors are hosted by VMware and you do not have to host them on your servers.

You can also enable or disable the OOTB connectors, just as with the pre-built or custom connectors.

The following OOTB connectors are available for Hub notifications:

- Salesforce discount request approval
- ServiceNow requisition request approval
- Concur expense request approval
- Coupa requisition request approval

The OOTB connectors are available at <https://github.com/vmware/connectors-workspace-one/tree/master/connectors>.

List of Pre-built Connectors

There are pre-built connectors available on Workspace ONE UEM console that can be configured and deployed to support specific business systems. Configure the connectors and map them from within the console for your mobile applications.

The source code for the pre-built connectors is available on <https://github.com/vmware/connectors-workspace-one/tree/master/connectors>. Note that pre-built connectors are different from OOTB (out-of-the-box) connectors and the list of available OOTB connectors is different from the pre-built connectors.

Table 2-1. Pre-built Mobile flows Connectors

Sample Business System Connector Name	Use Case Addressed
Salesforce	Add a contact to an existing account. Show the user existing contact details. Display or update the opportunity details related to the user.
ServiceNow	Approve or reject ServiceNow requests.
JIRA	Comment on an issue, watch an issue, or open an issue in a browser.
Bitbucket Server	Comment on and approve Bitbucket Server pull requests.
Github	Comment on and approve Github pull requests.
Gitlab	Comment on and approve Gitlab pull requests.
AWS	Approve AWS certificate requests.
AirWatch	Inviting a user to install apps that are missing from the user's device.
Concur	Approve an expense report, reject an expense report, and open an expense report in a browser.

Provision mobile flows

Depending on the type of user, you can provision mobile flows in different ways.

- If you are a shared SaaS Workspace ONE UEM user, GEM service enables the mobile flows Admin UI in the Workspace ONE UEM console when you purchase the mobile flows solution or Workspace ONE Enterprise SKU.
- If you are a dedicated SaaS Workspace ONE UEM user, you can place an order and VMware Deployments or the SaaS Operations team enables the Admin UI on the Workspace ONE UEM console by executing a SQL script in your database.
- If you are an On-Premises Workspace ONE UEM user, you can download the SQL script to run on the Workspace ONE UEM database to enable the mobile flows Admin UI. You need the *locationgroupID* where the mobile flows admin UI is to be enabled and the flag value to run the SQL script. To download the script and for more information, see [Workspace ONE Resources](#).

Configure mobile flows with Workspace ONE Boxer

4

Configure mobile flows for supported client applications such as Workspace ONE Boxer.

Workspace ONE Boxer is the email client provided to you by VMware. Apart from numerous email management features, you can configure and deploy custom application configurations to the Boxer app from the Workspace ONE UEM console. Mobile flows can be configured with Boxer using the application configuration keys.

Procedure

- 1 Log in to the Workspace ONE UEM console.
- 2 Navigate to **Apps & Books > Public**.
- 3 Select the **VMware Boxer** application in the **List View**, select **Assign**, and select **Add Assignment**.
- 4 Navigate to the **Optional** Application Configuration section of the Add Assignment page and add the configuration keys for enabling and configuring the mobile flows.

Table 4-1. Application Configuration Keys

Configuration Key	Value Type	Configuration Value	Description
AppMobileFlowsEnabled	Boolean	True - enabled False - disabled	Set to True to enable Mobile Flows for Boxer.
AppMobileFlowsHost	String	Provide <code>https://prod.hero.vmwservices.com</code> as the URL for the mobile flows host.	Define the URL for the mobile flows host.
AppMobileFlowsvIDM	String	Provide a valid URL for authenticating the device users through VMware Identity Manager. For example, <code>http://acme.vIDM.acme2.com</code>	Defines the URL for the device user to authenticate using the VMware Identity Manager instance.
AppMobileFlowsSyncTimeHours	Integer	Provide a sync value in hours. For example, 24.	Mobile flow cards are not requested for emails sent before the entered value.
AppMobileFlowsAutoEnableConnectors	Boolean	False - Disabled (default) True - Enabled	If enabled, when turning on mobile flows, all connectors are activated in succession. Enable this option only when all connectors are configured with VMware Identity Manager.

5 Select **Add** and then select **Save**.

Frequently Asked Questions

Frequently Asked Questions about VMware Workspace ONE mobile flows.

- What are the components of mobile flows?

- Cloud-hosted mobile flows service
- VMware Identity Manager
- Connectors
- Workspace ONE UEM console
- Workspace ONE Boxer

- Which are the mobile platforms that are supported?

Android and iOS.

- What are the minimum requirements to deploy mobile flows?

Though the authentication can be configured using any identity provider, to ensure an uninterrupted user-experience, you must use VMware Identity Manager to deploy mobile flows. Any backend services intended to be used by the mobile flows service must also be configured with VMware Identity Manager. The best user-experience is delivered when configured using OAuth2 flows.

- Can mobile flows be deployed on-premise?

Mobile flows is a cloud-only service available to both SaaS and on-premise Workspace ONE customers.

- How is mobile flows configured?

Customers can leverage mobile flows in three ways:

- Use out-of-the box (OOTB) pre-built connectors.
- Configure pre-built connectors to meet a specific requirements.
- Build custom connectors referencing the mobile flows framework. For more information about developing custom connectors, see <https://github.com/vmware/connectors-workspace-one/tree/master/connectors> and <https://github.com/vmware-samples/card-connectors-guide>.

- Is VMware Boxer a requirement to implement mobile flows?

Yes, Workspace ONE Boxer is required to take advantage of the experience.

- How do I purchase VMware Workspace ONE mobile flows?

Mobile flows is part of the new Workspace ONE Enterprise bundle that is provided along with Workspace ONE Intelligence. mobile flows is also available in the Workspace ONE Intelligence add-on SKU.