IFS Aviation Maintenance

Job Card Management API Guide

ICAM 26.2



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Introduction

Job Card Management API overview

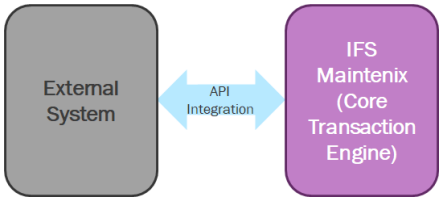
When job cards are created or updated in an external system, the version that resides in Maintenix will be outdated if there is no integration between the two systems. Integrating job card specific data from external systems to the core Maintenix database is required to have the job cards immediately reflect the changes in zones, panels, and steps.

The Job Card Management API provides a solution for integration between the external system and Maintenix to keep job cards between the two systems in sync, so that the technicians have the correct job card contents made available to them when performing maintenance.

About Maintenix APIs

Maintenix Application Programming Interfaces (APIs) support logical integrations with external business applications. You can also use Maintenix APIs for partial implementations, where your organization uses Maintenix in conjunction with an existing Enterprise Resource Planning (ERP) application, or for phased implementations, where workflows are supported by the existing ERP is transferred to Maintenix over time.

APIs simplify the task of integration, but do not deal with error handling between the integration layer of Maintenix and the external system. Messages are designed to describe the data in a flexible way, but message invocation is left open to customization. Timing considerations are particularly important when dealing with Web services that support a request-based integration as opposed to trigger-based integration.



Integration with Maintenix using APIs

There are three types of messaging scenarios available with the Maintenix APIs:

1. *Operational Service Messaging Scenario*: In this scenario, the external system sends an inbound message to Maintenix containing the information that Maintenix needs to function correctly. Upon successful processing of a message, Maintenix sends an outbound response message for confirmation.
2. *Querying Service Messaging Scenario:* In this scenario, the external system sends an inbound message to query information from Maintenix. Maintenix returns an outbound message containing the requested information.
3. *Notification Service Messaging Scenario*: In this scenario, certain Maintenix work flows create predefined events. These events are asynchonously pushed to an external system.

Note Not all APIs support all messaging scenarios.

Limitations

- The Job Card Management API does not support creating new job cards. It only supports validating and updating existing job cards.
- Not all HTML tags are supported. See the table in *Allowable HTML tags for large text fields* for the list of supported tags.
- Applicability range must follow Maintenix standards.

Allowable HTML tags for large text fields

Maintenix allows you to use a list of HTML tags in large text fields. This allows you to create notes, descriptions, and instructions that are richly formatted for easier reading. Any HTML tags that are not allowed will be simply display as text.

The following HTML tags and their appropriate attributes are allowed in large text fields in Maintenix:

Allowable HTML tags for large text fields

Tag	Description
<a>	For hyperlinks. Links can point to `http, https, ftp, and mailto`. This tag has an enforced `rel=nofollow` attribute.
<b>	For bold text.
<cite>	To display a citation.
<code>	To display computer code.
<blockquote>	To display text quoted from external sources.
<q>	To display a short quotation.
	For text that has stress emphasis.
<i>	To italicize text for technical terms, phrases, etc.
<small>	To display text with a smaller size.
	To apply a style to a phrase.
<strike>	To display strike-through text.
	For important text.
<sub>	For subscript text.
<sup>	For superscript text.
<u>	For underlined text.
 	Creates a line break.
<dl>, <dt>, <dd>	To define a description list, a description term, and description of the term in a list. <dl>, <dt>, and <dd> are often used together.
<p>	To separate paragraphs.
, ,	To define ordered or unordered lists and their list items.
<pre>	To define pre-formatted text. Usually used with the *width* attribute.
<table>	To define a table.
<th>	To define a table header cell.
<td>	To define a table cell.

Tag	Description
<tr>	To define a table row.
<caption>	To define a table caption.
<colgroup>, <col>	To specify column properties.
<thead>, <tbody>, <tfoot>	To group header, body, and footer content in a table

The following HTML tags are not allowed in large text fields in Maintenix:

- <img> tag and its attributes

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Setting up Job Card Management API

The following section provides setup and configuration information for the Job Card Management API.

License requirements

To use the Job Card Management API, you must have the JOBCARD_MANAGEMENT_API feature name added to your Maintenix `license.xml` file. Contact your Maintenix representative if you have any questions about licensing.

Configuration parameters

The UTL_CONFIG_PARM table contains the parameters that configure the Job Card Management API functionality.

These parameters are described in the table below.

Parameter	Description
ALLOW_MULTI_JOB_CARD_UPDATE	This parameter controls the behavior to update multiple job cards with the same job card code, created for the same assembly and different configuration slots. If set to TRUE, when an inbound message contains a job card code and if there are multiple job cards (created for same assembly and different configuration slots) with the same job card code code in Maintenix, all the job cards will be updated. If set to FALSE, none of the job cards with the same code will be updated.

Update mx-servers.properties

This file points Job Card Management Extension to the MX API endpoint.

About this task

You will need to update this file with appropriate values for your Maintenix installation.

Steps

1. Navigate to the `<maintenix_install_dir>/apps/assetmanagement/resource/property/` folder where your instance of Maintenix is installed.
2. Open `mx-servers.properties`.
3. Substitute `localhost` for values that correspond to your Maintenix installation.

```
maintenix.url=http://localhost
```

4. Save and close the file.

> **Important** You must restart your server for changes to the properties files to take effect.

Job Card Mangement API users

To facilitate the integration between Maintenix and Job Card Management API, a default user called jcintegration is created with the JCINTEG role.

This role gives the permissions required to authenticate and authorize inbound messages from from Toolbox to Maintenix.

The jcintegration user has the following details:

- First Name: jcintegration
- Last Name: jcintegration
- Username: jcintegration
- HR Code: SYSTEM
- Roles assigned: JCINTEG

Grant job card permissions to user roles

You can grant all users with a specific role permissions to receive job card messages.

Steps

1. From the **Administrator** menu, select **Role Search**.
2. Search for a role, then select it from the list.
3. Click the **Permission Sets** tab.
4. Under the Job Card Management setting, select the Job Card API permission set
5. Click **OK**.

Assign the JCINTEG role to a specific user

You can grant a specific user permissions to receive a Job Card Update request.

Steps

1. Go to the **Role Search** page.
2. Enter JCINTEG in the **Role Code** field and click **Search**.
3. On the **Role Details** page, **Users** tab, click **Assign User**.

> **Tip** If the user already appears on the **Role Details** page, select the user from the list and click **Assign User**. Other wise, follow the steps below.

4. On the **User Search** page, do any of the following:
   - Click **Search** to see a list of all users in the system.

- Enter the complete or partial name of the user in any of the user name fields and click **Search**.

5. Select a user from the list.
6. Click **Assign User**.

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Accessing the Job Card Management API component

The Job Card Management component is available at the following endpoint:

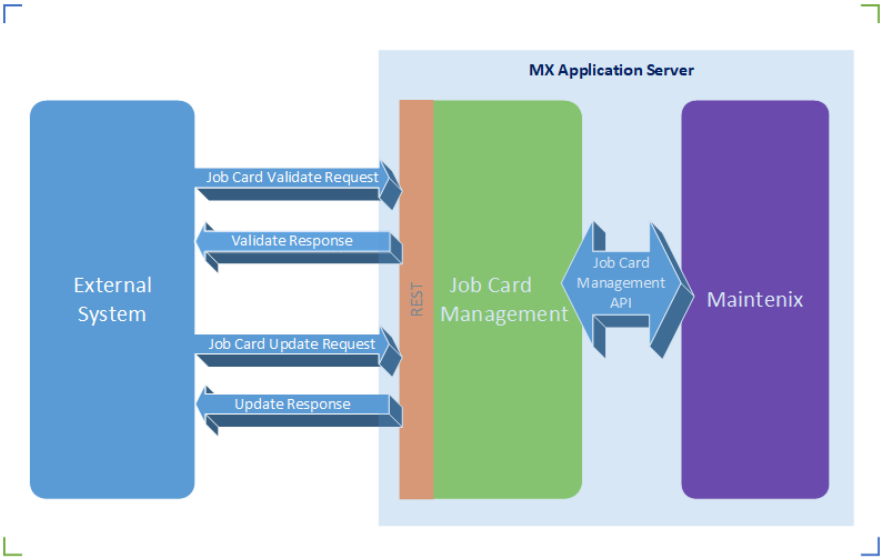
`http://<MaintenixURL>:<MX_port>/jobcard-management-api/update_jobcard`

> **Note** This endpoint is used both for validating and updating requests.

Application architecture

All the communication between external systems and Maintenix are in the JSON format. The Job Card Management API uses Swagger framework to validate the incoming JSON objects, against the schema.

Job Card Management endpoint is deployed in the same weblogic instance as Maintenix, as an add-on for Maintenix, running on the same platform.



Job Card Management API integration overview

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API scenarios

Validating job cards

You can use the Job Card Management API to validate your job card baseline information in Maintenix to make sure the job cards are available and the metadata such as zones, panels, labor skills, etc. are valid in Maintenix. This is usually done on request using an external system.

Validate job card request

Goal: To communicate the information about a job card from the external system to Maintenix for validation or update.

Summary: The incoming message should be compliant with schema provided. There are two types of validations, one against schema and one functional validation.

For schema validation, the JSON messages will be validated against the schema, using the Swagger framework.

The following validations represent the functional/business validation.

- Validate that the job card code exists in Maintenix.
- Validate that either the job card code or a combination of the job card code and OEM part number or configuration slot information is unique in Maintenix.
- Validate that the job card is not obsolete or locked.
- Validate that the zones exist in Maintenix.
- Validate that the panels exist in Maintenix.
- Validate that the labor skill codes exist in Maintenix.
- Validate that applicability range is compliant with Maintenix standards.

Important

The message must contain a job card code in the identification section. If the job card code is not provided, an error message is sent. For more information, see *Error codes*.

Messaging: The external system sends an inbound validate job card message.

Result: A Validate Job Card web service request is issued by the external system.

Reference schema:

Refer to the `update-job-card.json` file in `<maintenix_installation_folder>\documentation\Integrators and Developers\API Schemas\jobcard`.

Reference sample message:

Refer to the `validate-job-card-request-sample.json` file in `<maintenix_installation_folder>\documentation\Integrators and Developers\API Sample Messages\Job Card Management API`.

Validate job card response

Goal: To communicate to the external system that a validate job card request was received in Maintenix and return validation results.

Summary: Validate that the Job Card Request message was received by Maintenix.

Messaging: Maintenix returns an outbound job card response to the external system.

Result: The action (validate), job card code, and status code are returned. If validation fails, detailed errors are included in the response. For more information on error codes, see *Error codes*.

Reference schemas:

Refer to the `update-job-card.json` file in `<maintenix_installation_folder>\documentation\Integrators and Developers\API Schemas\jobcard`.

Reference sample message:

Refer to the `validate-job-card-response-sample.json` file in `<maintenix_installation_folder>\documentation\Integrators and Developers\API Sample Messages\Job Card Management API`.

Updating job cards

When the job card name, zones, panels and/or job card steps are updated in a job card in an external system, the business logic will perform validation and send a message to Maintenix for validation and subsequent update.

A new job card revision will be created in Maintenix if the latest job card status is ACTIVE.
The name of the integration user authenticated when sending the message will be assigned to Revision Contact and Revision Created By names in the revision of the job card. Job cards in BUILD or REVISION status can also be updated using these messages.

The following information about the job card can be updated:

- Details
  - Name
  - Description
  - Document Reference
  - Instructions
- Zones
  - Deletes all existing zones and adds new zones from the request. If a value of null is set for zoneList, it will delete all zones on the job card. The source system has to resubmit zones even if no changes have been made, to prevent deleting this information in the new revision.
- Panels
  - Deletes all existing panels and adds new panels from the request. If a value of null is set for panelList, it will delete all panels on the job card. The source system has to resubmit panels even if no changes have been made, to prevent deleting this info in the new revision.
- Steps
  - Deletes all existing steps and adds new steps from the request. If a value of null is set for jobCardStepList, it will delete all steps on the job card. But the Labor Skills categorized under Labor Requirements will not be deleted or changed. The source system has to resubmit steps even if no changes have been made, to prevent deleting this info in the new revision.

In case of an update failure, the job card revision is canceled and an appropriate error message is displayed. For more details, see *Error codes*.

Update job card request

Goal: Communicate the information about a job card update from the external system to Maintenix.

Summary:

An Update Job Card web service request is issued by the external system. A single Update Job Card web service request should contain only single job card code.

Result: The job card is validated and is updated if it exists in Maintenix; otherwise an error message is generated. For more information on error codes, see *Error codes*.

Reference schema:

Refer to the `update-job-card.json` file in `<maintenix_installation_folder>\documentation\Integrators and Developers\API Schemas\jobcard`.

Reference sample message:

Refer to the `update-job-card-request-sample.json` file in `<maintenix_installation_folder>\documentation\Integrators and Developers\API Sample Messages\Job Card Management API`.

Update job card response

Goal: Communicate to the external system that an update job card request was received in Maintenix and return update results.

Summary: An Update Job Card Request message is received by Maintenix.

Result: If validation passes, the job card is updated and success response is returned. If validation fails, detailed errors are included in the response. For more information on the error codes, see *Error codes*.

Reference schema:

Refer to the `update-job-card.json` file in `<maintenix_installation_folder>\documentation\Integrators and Developers\API Schemas\jobcard`.

Reference sample message:

Refer to the `update-job-card-response-sample.json` file in `<maintenix_installation_folder>\documentation\Integrators and Developers\API Sample Messages\Job Card Management API`.

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Logging

Integration events, exceptions, and responses are logged in the Maintenix log files. The log files use standard formats that you can configure to work with your own log processing and monitoring tools.

The primary log file is `maintenix.log`. This file uses Log4j format.

HTTP requests are also logged in `weblogic-access.log` which you have the option to monitor in real time.

For information on configuring logging, see the *Maintenix Installation and Configuration Guide*.

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Error codes

This section provides a description of the error codes that are returned, based on the incoming messages.

Error code	Type	Description
1001	Schema	Update job card message is not valid for the schema.
2001	Job card	Job card code is not found in Maintenix.
2002	Job card	Job card status is OBSOLETE.
2003	Job card	Job card is locked.
2004	Job card	Duplicate job card code found in Maintenix. Additional information is required (assembly code, configuration slot, or part number information).
2005	Job card	Cannot update multiple job cards since a duplicate code was found on another assembly. This error code is based on the configuration parameter API_ALLOW_MULTI_JOB_CARD_UPDATE.
2006	Job card	Cannot update multiple job cards since the code exists for both configuration slot based job card and part number based job card. This error code is based on the configuration parameter API_ALLOW_MULTI_JOB_CARD_UPDATE.
3001	Zones and panels	A zone code is not found in Maintenix for a specified assembly.

Error code	Type	Description
3002	Zones and panels	A panel code is not found in Maintenix for a specified assembly.
3003	Zones and Panels	Zones/Panels cannot be added to part number type job cards.
4001	Job card steps	Invalid job card step order sequence.
4002	Job card steps	Invalid job card step applicability range for a step order number.
4003	Job card steps	Labor Skill Code 'XXX' is not found in Maintenix.
9000	Maintenix exception	MX-ERR error was encountered during the job card request.
9999	Runtime error	Unexpected error was found during the job card request.

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