



# **T2 Flex® 15.4 External Web Services**

**API Reference**

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## CHAPTER 1: INTRODUCTION

- This document is provided for T2 customers and business partners who wish to integrate external programs with T2 Flex® by writing custom Web services that can be called at certain points in Flex processing. Only the custom actions and integration points described in this document are currently supported for external integrations.
- This document is intended for systems administrators who are responsible for the installation and configuration of T2 Flex, and for developers who need to write programs that interact with T2 Flex data.
- This document assumes the reader's familiarity with Web services, with relational databases, and with API programming in general. While this document describes requirements for external T2 Flex Web services in detail, it does not attempt to describe the use of Web services in every possible programming context. Consult the documentation for your programming language of choice to determine what mechanisms exist for calling Web services. In addition, many public Internet sites that contain sample code for calling Web services in various programming languages.

## TERMINOLOGY

- For the purposes of this document the following terminology is used:

**Web Service:** A Web service is a specific type of program whose purpose is to allow exchange of data with other systems. The public interface to a Web service is specified in XML, and the exchange of data with a Web service also uses XML-based messages, conveyed using standard Internet protocols such as HTTP and SOAP.

**Web Service Method:** A method is an API function that is exposed by a Web service.

**UID:** Abbreviation for Unique Identifier: a column found in the T2 Flex database that uniquely identifies a record.

**Adjudication:** General term used in T2 Flex technical designs and documentation for the common synonyms **appeal** or **hearing**.

**Contravention:** General term used in T2 Flex technical designs and documentation for common synonyms such as **citation**, **ticket**, or **violation**.

**Entity:** General term used in T2 Flex technical designs and documentation for the common synonym **customer**.

**Permission:** General term used in T2 Flex technical designs and documentation for the common synonym **permit**.

## CHAPTER 2: EXTERNAL WEB SERVICES

### EXTERNAL CUSTOM ACTION WEB SERVICES

■ T2 Flex allows you to configure custom actions that call an external system at certain points in your business processes. Currently, custom actions can only be configured for permits at the point of sale, for validation of receipt custom fields, and for certain changes to citation statuses. See the [Custom Action Lookup Table](#) in Flex Online Help for details.

■ The interface is based on a vendor-neutral Web Service model over which you have full control. However, your Web Methods **MUST** contain the following general inputs and outputs in order for T2 Flex to call and consume them appropriately.

#### Custom Action Web Method

##### *Input XML Parameters*

■ The parameters for this Web Method can vary depending on the purpose of the web method. Each column specified in the Input Query (selected on the Custom Action Configuration lookup table in T2 Flex) will correspond to an XML node sent to the external Web Method.

##### *Return XML Parameters*

Field	Description
SUCCESS	An integer value used to determine success or failure of the external action. Value = 1  ■ <b>Note:</b> If the ERROR_NUMBER and ERROR_DESCRIPTION are returned, this field will not be returned (and vice versa).
ERROR_NUMBER	The error number associated with the ERROR_DESCRIPTION. This indicates that the external Web Method has encountered a processing error or has broken internal business logic.
ERROR_DESCRIPTION	The error description associated with the ERROR_NUMBER.  ■ <b>Note:</b> If multiple ERROR_NUMBER fields are returned, multiple corresponding descriptions will be returned as well.

##### *Usage Notes*

■ When invoking the Custom Action Web Method, T2 Flex will populate these fields with the values specified on the Custom Action Configuration lookup table:

**XmlData:** Contains the necessary XML data to be consumed by the Web Method.

**Version:** The version of the Web Method to use.

**UserName:** The user name against which to authenticate.

**Password:** The password against which to authenticate the given user.

■ T2 Flex will be performing an HTTP Post to call the external Web Methods. The external Web Service will need to be configured to allow HTTP Posts. For example, if the external Web Service is implemented in .NET, the following should be added to the Web Service's Web.Config file:

```
■ <configuration>
■ <system.web>
■ <webServices>
■ <protocols>
■ <add name="HttpPost"/>
■ </protocols>
■ </webServices>
■ </system.web>
■ </configuration>
```

## EXTERNAL PERMIT ELIGIBILITY WEB SERVICES

■ A customer's eligibility for Permit sales is determined using internal T2 Flex rules based on a customer's sub-classification, sales limits, as well as additional internal logic. To provide the maximum amount of flexibility, an external interface allows you to determine your own eligibility rules for tracked permits. The eligibility interface is based on a vendor-neutral Web Service model over which you have full control. However, you must configure both the Number Range Eligibility Web Method (selects the PNR) and the Single Permit Eligibility Web Method (sells a specific permit from the PNR). Also, the Web Methods MUST contain the general inputs and outputs documented here in order for T2 Flex to call and consume them appropriately.

### Detailed Workflow

- 1) Request via a query any permits for which this user might be eligible based on their subclassification and/or facilities.
- 2) Call out to Flex WS to determine what permits the user is allowed to purchase based on External Eligibility
- 3) Loop through the permits we get back, checking various FlexPort and Flex criteria (PCG not setup complete, PCG not yet available for sale, PCG is not in the list returned to us via the External Eligibility web service call, customer over their limit for the PCG, etc.)

- Each failure logs a record to the basket in FlexPort indicating why the user was not eligible to purchase a particular PCG. In the case of External Eligibility, it gets logged as:

```
PCG: {0} unavailable: PCG/PNR Refused for custom reason enforced by external eligibility [P198]
```

- (where {0} is the a description of the PCG)

## Number Range Eligibility Web Method

- The Number Range Eligibility Web Method is used by T2 Flex to return a list of permit number ranges for which a customer is eligible. The parameters for this Web Method can vary depending on the permit number range's eligibility rules.

### Input XML Parameters

Parameter	Description	Required?
ENT_UID	The UID for the customer whose permit number range eligibility is being determined.	Yes
PNA_UID	The UID for the permit number range(s) for which the customer is eligible to purchase in T2 Flex.	No, only for permit number ranges set to <b>T2 Flex Rules External Override</b>
Other fields	Additional T2 Flex fields from the Number Range Input Query (defined in Permit System Settings) may be provided. An XML field will be created for each field specified in the query. Each column in the query will correspond to a parameter sent to the Web Method.	No

### Return XML Parameters

Parameter	Description
PNA_UID	The UID for the permit number range(s) for which the customer is eligible to purchase, provided in ascending order.  If ERROR_NUMBER and ERROR_DESCRIPTION are returned, this field will not be returned.
SYSTEM_MSG	A message indicating status, warning, or other details that will be displayed to the T2 Flex user.  This field will occur once and cannot be repeated.

	If ERROR_NUMBER and ERROR_DESCRIPTION are returned, this field will not be returned.
ERROR_NUMBER	If the Web Method encounters a processing error or has broken internal business logic, one or more error numbers will be returned along with corresponding error descriptions.  If PNA_UID or SYSTEM_MSG are returned, ERROR_NUMBER and ERROR_DESCRIPTION will not be returned.
ERROR_DESCRIPTION	The error description associated with the ERROR_NUMBER.  If PNA_UID or SYSTEM_MSG are returned, ERROR_NUMBER and ERROR_DESCRIPTION will not be returned.

### Usage Notes

■ When invoking the Number Range Eligibility Web Method, T2 Flex will populate these fields with the values specified in Permit System Settings:

**XmlData:** Contains the necessary XML data to be consumed by the Web Method.

**Version:** The version of the Web Method to use.

**UserName:** The user name against which to authenticate.

**Password:** The password against which to authenticate the given user.

■ T2 Flex will be performing an HTTP Post to call the external Web Methods. The external Web Service will need to be configured to allow HTTP Posts. For example, if the external Web Service is implemented in .NET, the following should be added to the Web Service's Web.Config file:

```

■ <configuration>
■ <system.web>
■ <webServices>
■ <protocols>
■ <add name="HttpPost"/>
■ </protocols>
■ </webServices>
■ </system.web>
■ </configuration>

```

## Single Permit Eligibility Web Method

■ The Single Permit Eligibility Web Method is used by T2 Flex to determine eligibility for the sale of a specific permit to a customer. The parameters for this Web Method can vary depending on the permit number range's eligibility rules.

### Input XML Parameters

Parameter	Description	Required?
PER_UID	The UID of the permit whose eligibility is being determined.  For Non-Inventoried Permits, this field will be blank since the UID is not assigned until after the permit is sold.	Yes
PEC_UID	The UID of the Control Group whose permit eligibility is being determined.	Yes
ENT_UID	The UID of the customer whose permit eligibility is being determined.	Yes
FLEX_ELIGIBILITY	Boolean value indicating whether or not the customer is eligible for the permit based on T2 Flex's business logic.  1 = eligible, 0 = not eligible	No, only for permit number ranges set to <b>T2 Flex Rules External Override</b>
VIOLATES_SUBCLASS_ELIGIBILITY	Boolean value indicating whether or not the customer violates T2 Flex's subclassification eligibility for the permit.  1 = violates, 0 = does not violate	No, only for permit number ranges set to <b>T2 Flex Rules External Override</b>
VIOLATES_SALES_LIMITS	Boolean value indicating whether or not the sale of the permit to the customer violates T2 Flex's subclassification sales limit for the permit.  1 = violates, 0 = does not violate	No, only for permit number ranges set to <b>T2 Flex Rules External Override</b>



VIOLATES_SALES_CAPACITY	Boolean value indicating whether or not the sale of the permit to the customer violates T2 Flex's sales capacity for the permit.  1 = violates, 0 = does not violate	No, only for permit number ranges set to <b>T2 Flex Rules External Override</b>
VIOLATES_WAITLIST_RULES	Boolean value indicating whether or not the sale of the permit to the customer violates T2 Flex's Wait List rules for the permit (i.e. whether or not they have been awarded the <b>right</b> to purchase the permit).  1 = violates, 0 = does not violate	No, only for permit number ranges set to <b>T2 Flex Rules External Override</b>
VIOLATES_PROPERTY_RULES	Boolean value indicating whether or not the sale of the permit to the customer violates T2 Flex's Property rules for the permit.  1 = violates, 0 = does not violate	No, only for permit number ranges set to <b>T2 Flex Rules External Override</b>
VIOLATES_PERMISSION_ALLOTMENT_RULES	Boolean value indicating whether or not the sale of the permit to the customer violates T2 Flex's Permit Allotment rules for the permit.  1 = violates, 0 = does not violate	No, only for permit number ranges set to <b>T2 Flex Rules External Override</b>
Other fields	Additional T2 Flex fields from the Single Permit Eligibility Input Query (defined in Permit System Settings) may be provided. An XML field will be created for each field specified in the query. Each column in the query will correspond to a parameter sent to the Web Method.	No

**Return XML Parameters**

Parameter	Description
IS_ELIGIBLE	Boolean value indicating whether or not the permit has been deemed eligible by the Single Permit Eligibility Web Method.

	1 = eligible, 0 = not eligible
NON_ELIGIBLE_REASON	Text value describing why the customer was not eligible for the given permit.  This parameter is only returned (and is required) if IS_ELIGIBLE is set to 0.
NOT_ELIGIBLE_SUBCLASS	Boolean value indicating T2 Flex should treat the given permit as if it had violated T2 Flex subclassification eligibility.  1 = violates subclassification eligibility, 0 = does not violate  This parameter is only returned (and is required) if IS_ELIGIBLE is set to 0. If this value is 1, it will override any value in the NON_ELIGIBLE_REASON parameter.
NOT_ELIGIBLE_SALES_LIMIT	Boolean value indicating T2 Flex should treat the given permit as if it had violated T2 Flex subclassification sales limit.  1 = exceeds limit, 0 = within limit  This parameter is only returned (and is required) if IS_ELIGIBLE is set to 0. If this value is 1, it will override any value in the NON_ELIGIBLE_REASON parameter.
NOT_ELIGIBLE_SALES_CAPACITY	Boolean value indicating T2 Flex should treat the given permit as if it had exceeded T2 Flex sales capacity.  1 = exceeds capacity, 0 = within capacity  This parameter is only returned (and is required) if IS_ELIGIBLE is set to 0. If this value is 1, it will override any value in the NON_ELIGIBLE_REASON parameter.
NOT_ELIGIBLE_WAITLIST_RULES	Boolean value indicating T2 Flex should treat the given permit as if it had violated T2 Flex Wait List rules.  1 = violates, 0 = does not violate  This parameter is only returned (and is required) if IS_ELIGIBLE is set to 0. If this value is 1, it will override any value in the NON_ELIGIBLE_REASON parameter.
NOT_ELIGIBLE_PROPERTY_RULES	Boolean value indicating T2 Flex should treat the given permit as if it had violated T2 Flex Property rules.

	<p>1 = violates, 0 = does not violate</p> <p>This parameter is only returned (and is required) if IS_ELIGIBLE is set to 0. If this value is 1, it will override any value in the NON_ELIGIBLE_REASON parameter.</p>
NOT_ELIGIBLE_PERMISSION_ALLOCATION_RULES	<p>Boolean value indicating T2 Flex should treat the given permit as if it had violated T2 Flex Permit Allotment rules.</p> <p>1 = violates, 0 = does not violate</p> <p>This parameter is only returned (and is required) if IS_ELIGIBLE is set to 0. If this value is 1, it will override any value in the NON_ELIGIBLE_REASON parameter.</p>

### Usage Notes

■ When invoking the Single Permit Eligibility Web Method, T2 Flex will populate these fields with the values specified in Permit System Settings:

**XmlData:** Contains the necessary XML data to be consumed by the Web Method.

**Version:** The version of the Web Method to use.

**UserName:** The user name against which to authenticate.

**Password:** The password against which to authenticate the given user.

■ T2 Flex will be performing an HTTP Post to call the external Web Methods. The external Web Service will need to be configured to allow HTTP Posts. For example, if the external Web Service is implemented in .NET, the following should be added to the Web Service's Web.Config file:

```

■ <configuration>
■ <system.web>
■ <webServices>
■ <protocols>
■ <add name="HttpPost"/>
■ </protocols>
■ </webServices>
■ </system.web>
■ </configuration>

```

## EXTERNAL SALES WEB SERVICES

- External sales interface functionality enables T2 Flex to act as the POS station for any external system and maintain a record of the sale within a customer record in T2 Flex. This feature makes use of a single Web Service defined in **System Settings > Interfaces** that contains the following two Web Methods. The interface is based on a vendor neutral Web Services model over which you have full control. However, your Web Methods MUST contain the following inputs and outputs in order for T2 Flex to call and consume them appropriately.

### Record/Adjust External Sale Web Method

- The Record/Adjust External Sale Web Method is used by T2 Flex to allow external systems to insert sales items or make adjustments on existing items.

#### Input XML Parameters

Parameter Name	Description	Required?
EXT_SALE_ITEM_TYPE_UID	A UID that matches the type of external sales item being sold.	Yes, if EXT_TRANS_TYPE is 1
EXT_SALE_ITEM_UID	A UID matching an existing external sale item.	Yes
EXT_TRANS_TYPE	1 = New sale (default if the field is omitted) 2 = Adjustment 3 = Alter Custom Field(s)	No
AMOUNT	If EXT_SALE_TYPE is 1, then this is the initial amount of the external item. This value can be negative if the sale item type allows negative values. If the EXT_SALE_TYPE is 2, the amount determines the amount used to adjust the sale item and can be negative as well.	Yes, if EXT_TRANS_TYPE is 1 or 2
ADJ_REASON	If EXT_TRANS_TYPE = 2, this field specifies the reason for the adjustment. The reason is	No

	added to the financial history for the external sale item.	
ENT_UID	The UID of the entity who should be assigned the external sales item.	No
ENT_PRIMARY_ID	The primary ID of the entity who should be assigned the external sales item.	No
ENT_SECONDARY_ID	The secondary ID of the entity who should be assigned the external sales item.	No
ENT_TERTIARY_ID	The tertiary ID of the entity who should be assigned the external sales item.	No
Custom Fields	Custom fields can be passed into the web method and are identified by their field names in T2 Flex.	Determined by Data Dictionary Settings.

### Return XML Parameters

Parameter Name	Description
EXT_SALE_ITEM_UID	The UID of the external sales item created by T2 Flex.  If ErrorNumber and ErrorDescription are returned, this field will not be returned (and vice versa).
ErrorNumber	A code indicating an error occurred during the insertion or adjustment process.
ErrorDescription	A description of the error that occurred during the insertion or adjustment process.  If multiple ErrorNumber fields are returned, multiple corresponding descriptions will be returned as well.  If EXT_SALE_ITEM_UID is returned, no errors will be returned.

### Usage Notes

■ When invoking the Record/Adjust External Sale Web Method, T2 Flex will populate these fields with the values specified in Interfaces System Settings:

**XmlData:** Contains the necessary XML data to be consumed by the Web Method.

**Version:** The version of the Web Method to use.

**UserName:** The user name against which to authenticate.

**Password:** The password against which to authenticate the given user.

■ Although none of the customer related fields (ENT\_UID, ENT\_PRIMARY\_ID, ENT\_SECONDARY\_ID and ENT\_TERTIARY\_ID) are required, *T2 Flex must match exactly one customer when trying to record an external sale*. It will search for the customer using all supplied fields, in order. If no match is found, or multiple matches are found, an error is returned and the web method will fail.

■ Zero balance external items cannot be adjusted. An external sales item also cannot be “adjusted past zero”. If an external sales item has an initial negative balance, it cannot be adjusted higher than zero. Similarly, if an external sales item has an initial positive balance; it cannot be adjusted lower than zero.

■ Custom fields can be set when the sale item is inserted and can also be altered using a subsequent call to the Web Method if desired. Flex compares each custom field specified in the XML input with the current value of the custom field. If there is a difference, Flex will alter the custom field to be the new value.

### Possible Errors Returned

EXT\_SALE\_ITEM\_TYPE\_UID is missing or invalid.

EXT\_TRANS\_TYPE is missing or invalid.

AMOUNT is missing or invalid.

Cannot find entity (to attach the external sales item).

Found more than one Entity.

Cannot find external sales item (for an adjustment).

Data dictionary error (if a field doesn’t match a data dictionary rule, such as a regular expression or uniqueness constraint).

## Items Sold Web Method

■ The Items Sold Web Method is used by T2 Flex to reconcile sales from T2 Flex to the external system. It informs the external system that payment has been received for items purchased by a customer. It can also be used when a receipt is reversed that includes external sale item(s) by sending a negative value for the AMOUNT\_PAID.

### Input XML Parameters

Parameter Name	Description	Required?
EXT_SALE_ITEM_TYPE_UID	The UID of the type of item being sold.	Yes

EXT_SALE_ITEM_UID	The UID of the external sale item that was sold.	Yes
ERQ_UID	The UID of the record in the EXT_SALE_ITEM_RESEND_REL table.	Yes
DESCRIPTION	The description of the item.	No
DATE_PAID	The date on which the item was paid.	No
AMOUNT_PAID	The amount that was paid for the item, excluding taxes.	No
TAX_1_AMOUNT	The amount that was paid for the item that was taxed by tax 1.	No
TAX_2_AMOUNT	The amount that was paid for the item that was taxed by tax 2.	No
TAX_3_AMOUNT	The amount that was paid for the item that was taxed by tax 3.	No
TRANSACTION_COMPLETE	A Boolean flag indicating if T2 Flex considers the item paid for in full.	No
REC_UID	The UID of the receipt for the item paid.	No
Custom fields	All custom fields associated with the external sales item will be sent as input parameters to this web method.	Determined by Data Dictionary Settings.
Other fields	Other fields from the input query specified in Interfaces System Settings can appear in the input parameter list. The field names in the XML correspond to the field names in the query.  For example, REC_PAYMENT_METHOD_DISPLAY might be passed in to display the payment method used in plain text.	

### Return XML Parameters

Parameter Name	Description
EXT_SALE_ITEM_UID	The External Sale Item UID for the sale. Since one receipt can hold more than financial transaction, the External Sale Item

	UID is required to identify which transaction in the receipt was processed.
ERQ_UID	The UID of the Record from the EXT_SALE_ITEM_RESEND_REL table. This is required for T2 Flex to match the transaction back to its own records.
RESPONSE_CODE	1 = Indicates the External Sales Item is accepted. 2 = Indicates the External Sales Item should be re-sent later.
ErrorNumber	A code indicating an error occurred during the insertion or adjustment process.
ErrorDescription	A description of the error that occurred during the insertion or adjustment process.

### Usage Notes

■ When invoking the Items Sole Web Method, T2 Flex will populate these fields with the values specified in Interfaces System Settings:

**XmlData:** Contains the necessary XML data to be consumed by the Web Method.

**Version:** The version of the Web Method to use.

**UserName:** The user name against which to authenticate.

**Password:** The password against which to authenticate the given user.

■ The web method should return one record for each item submitted, encapsulated inside of an <Item> node, indicating the status of the item.

### Possible Errors Returned

■ The errors returns from this web method depend on the implementation of the external system.