Technical White Paper

Universal Personalization Services: UPSGetRange web method

A Basic Guide

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UPS Console

Universal Personalization Services (UPS) supports on-site operations with a versatile solution called UPS Console. This solution provides the manufacturing site to integrate with HP custom integration services. This document illustrates one proposed method to save time and money on operator training at manufacturing sites. The reduced ramp-up eliminates the need for significant operator re-training that would normally ensue from a full-fledged integration of UPS with the factory shop-floor automation system.

Introduction

UPS offers extensive capabilities to support unit personalization in conjunction with support for Custom Integration Services (CIS) by HP in close cooperation with manufacturing sites across the world. A standard approach to supporting CIS services envisages that all factory sites process data in a service-oriented manner that relies on industry standards and best practices for an efficient manufacturing supply chain.

Goal

This document illustrates a web method to retrieve asset numbers at a site for a specific purchase order.

Objective
The use of this web method will permit the factory site to retrieve data from UPS Site Server using techniques integrated with the shop floor automation systems.

Key Operation
The key operation is:

- Retrieve Asset Range number list

Important Assumption and Limitation
This document is not the comprehensive reference guide for any UPS activity. You should contact the UPS Development team for more detailed information on UPS. This document is limited to the illustration of the key operation described in the following sections.

Key Definitions

The proper consideration of the following terms will lead to a better understanding of the proposed web method:

- Asset number

  A code that uniquely identifies an asset in UPS for a specific customer

- Mask

  A string that defines what characters can be substituted in the asset number in accordance with accepted industry practices. The mask may include the concept of prefixes and suffixes

Asset Number List

HP relies on more than one factory to manufacture products for its global customers. If these products require asset tag services then a systematic and automated distribution of asset numbers is desirable to avoid fragmentation of the asset number pool consigned by the customer to HP. In other words, factories do not need to reserve a large range of unused

asset numbers simply because these would be not available in a timely manner during manufacturing. UPS Console attempts to retrieve the range of asset numbers for an order in about thirty minutes on average. This method of operation permits smaller ranges to be distributed and the fragmentation of the consigned pool substantially minimized.

Mask Formatting

Mask Data Format (*RangeStart – RangeEnd*)

This is the current mask supported which will assign auto-incremental numbers to the asset to be printed depending on the Range Start and Range end provided by the customer.

For example: *MASK%5dFormat* will be rendered into MASK00001Format upon printing if the range number is 00001.

Mask Date Format

UPS relies on Seagull Scientific BarTender licensed program product to print the date based on the format specified for the corresponding field. There are supplementary components available to manage the format if the HP PRISM process is used.

Mask Checksum Format

UPS relies on Seagull Scientific BarTender licensed program product to print the checksum based on the format specified for the corresponding field. There are supplementary components available to manage the format if the HP PRISM process is used.

Web Method

Method Syntax

```
[WebMethod]
public ATRPStruct UPSGetRange(string PartNumber, string AssetNumberName, string
HPPO)
```

Parameters

The following table lists the parameters for the proposed `UPSGetRange` method:

Parameter	Type	Description
`PartNumber`	`string`	Customer specific AV asset tagging part number found on BOM
`AssetNumberName`	`string`	Name of the asset number as defined by CS Engineering
`HPPO`	`string`	Order reference number that was previously communicated to UPS Site server using a SendBOM method

Return Value

Type: `ATRPStruct`

Structure

The following figure illustrates the general response from the proposed `UPSGetRange` method:

```
public struct ATRPStruct
{
        public string version;
        public int retcode;
        public string message;
        public DataSet tagdata;
}
```

Field Values
The following table explains the data values in the response object:

Parameter	Type	Description
version	string	The web service version number
retcode	int	The return code from the web service in response to the current parameters submitted by the client application. Typical return codes are: 0 = success -1 = failure
message	string	Error message (if applicable)
tagdata	DataSet	Each row of the dataset consists of the following items: Column 0: integer representing a starting value of the range Column 1: integer representing an ending value of the range Column 2: string representing the asset number mask

Risk
Subsequent calls to the proposed `UPSGetRange` method with the same parameter values will return an empty `DataSet` **because the initial call will have consumed the available values.**

Assumptions

This method has the following underlying assumptions:

- The Site uses one of the `SendBOM` web methods available in the UPS Primary Interface (PUPS) to notify UPS of the order previously before invoking the proposed `UPSGetRange` method.
- The Site allows sufficient time for UPS to service the range requests.
- The Site uses the same HPPO value for the invocation of the chosen `SendBOM` method first and the proposed `UPSGetRange` method subsequently.
- The Site has the asset number name of the requested asset number. The CS Engineering team defines the name; The UPSConsle application retains this data.
- The Site has the responsibility to generate the data for the asset tag string for printing.
- The Site must use the asset number mask with the range of numbers returned by the proposed `UPSGetRange` method to generate the customer asset number for the corresponding asset tag field.
- The UPS site database will mark all range data lists returned by the proposed `UPSGetRange` method as depleted inventory (0% available).

The follwoing code snippet illustrates the client side operations to:

- Submit the request to the UPS Site server
- Process the response data

The code snippet does not exhaustively illustrate all the operations needed in the client application for robust handling of shopfloor practices.

CODE Example C#

```
public struct ATRPStruct
{
    public string version;
    public int retcode;
    public string message;
    public DataSet tagdata;
}

namespace UPS_ATRPConsumer
{
    class Program
    {
        static void Main(string[] args)
        {
            UPS_ATRPConsumer.localhost.ATRPStruct retval = new
UPS_ATRPConsumer.localhost.ATRPStruct();
            UPS_ATRPConsumer.localhost.ATRP svc = new
UPS_ATRPConsumer.localhost.ATRP();

/**** site must use its own URL and not necessarily the one illustrated below ****/
            svc.Url = "http://localhost/UPSATRP/UPS_ATRP.asmx";

/**** test data; the values for your site may be different ****/
            string partNo = "YM987AV";
            string assetNo = "YM987AV";
            string hppo = "TestHPPO";


            int startingval = 0;
            int endingval = 0;
            string mask = String.Empty;

            retval = svc.UPSGetRange(partNo, assetNo, hppo);
             if (retval.retcode == 0)
            {
                if (retval.tagdata.Tables["Ranges"].Rows.Count > 0)
                {
                    foreach (DataRow dr in retval.tagdata.Tables["Ranges"].Rows)
                    {
                         startingval = dr[0];
                         endingval = dr[1];
                         mask = dr[2];
/****  site must decide what to do with the rerieved values  ****/
                    }
                }
                else
                {
                    // no range values available for parameter combination
                }
            }
            else
            {
                // error condition - read retval.message
            }
        }
    }
```

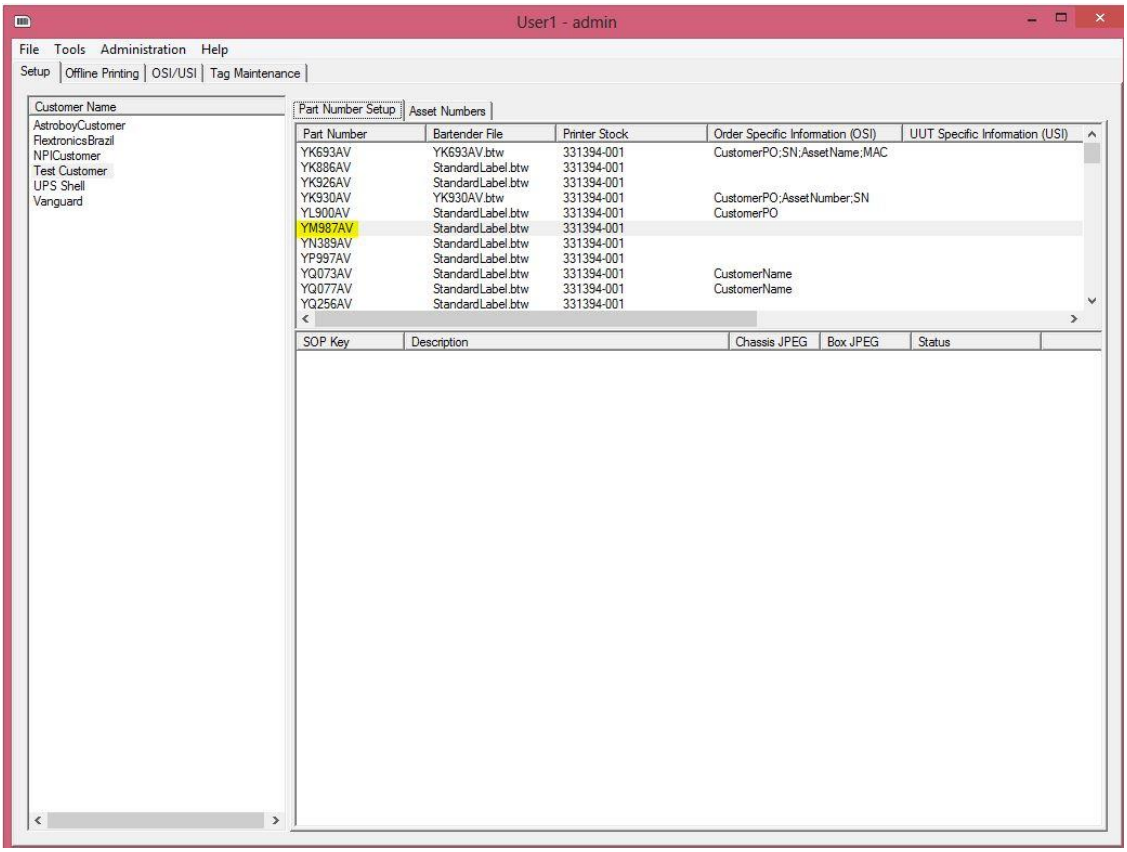
Test Example

The following sections illustrate the use of the web service, **UPSGetRange**, using sample data in a test lab infrastructure. The data values in this test example are intended for for internal use only. These data values may be different at manufacturing sites.

On the assumption that the **UPSSendBOMWithCTO5** (or equivalent) method was invoked previously and that the range was derived from the UPS Master server, the UPS Console application will display the data needed as input parameters for the UPSGetRange method:

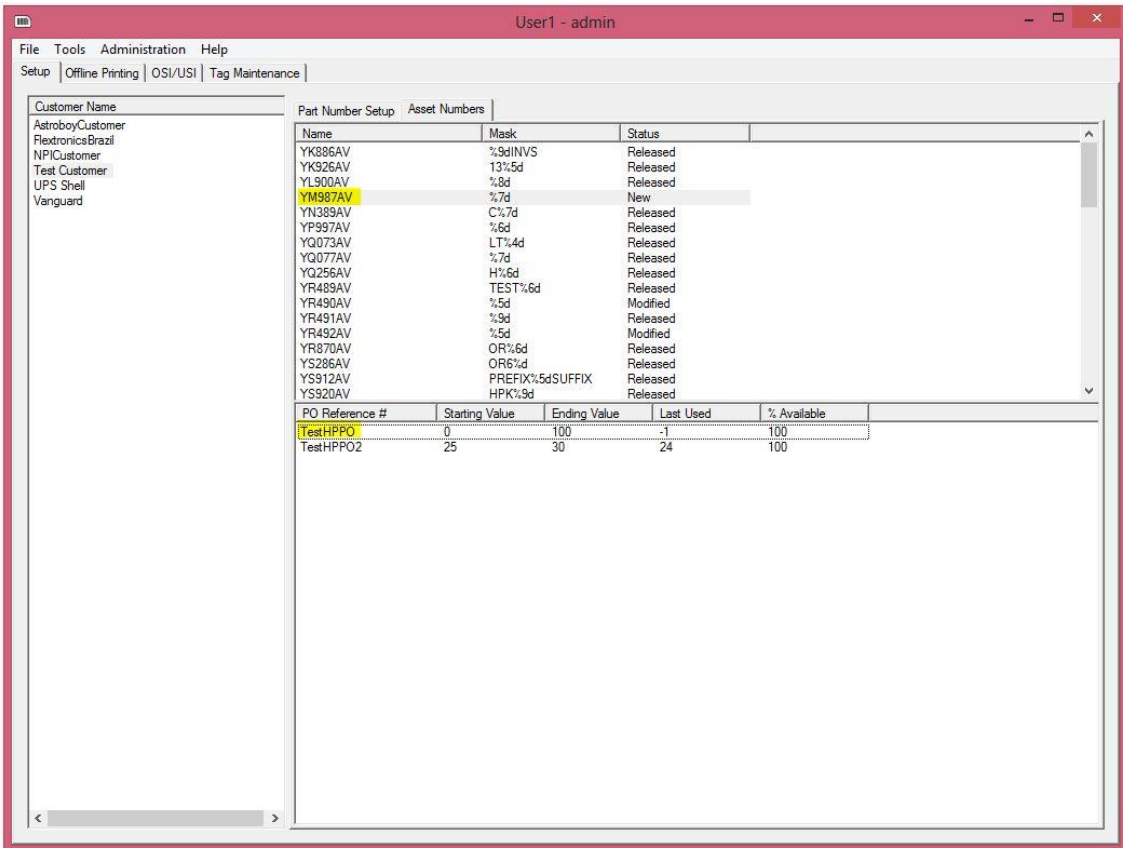
- Part Number
  The value is a string element – *YM987AV*
- Asset Number
  The value is a string element – *YM987AV*
- HPPO
  The value is a string element - *TestHPPO*

The following screen shots of the UPS Console application illustrate the value of the input parameters:



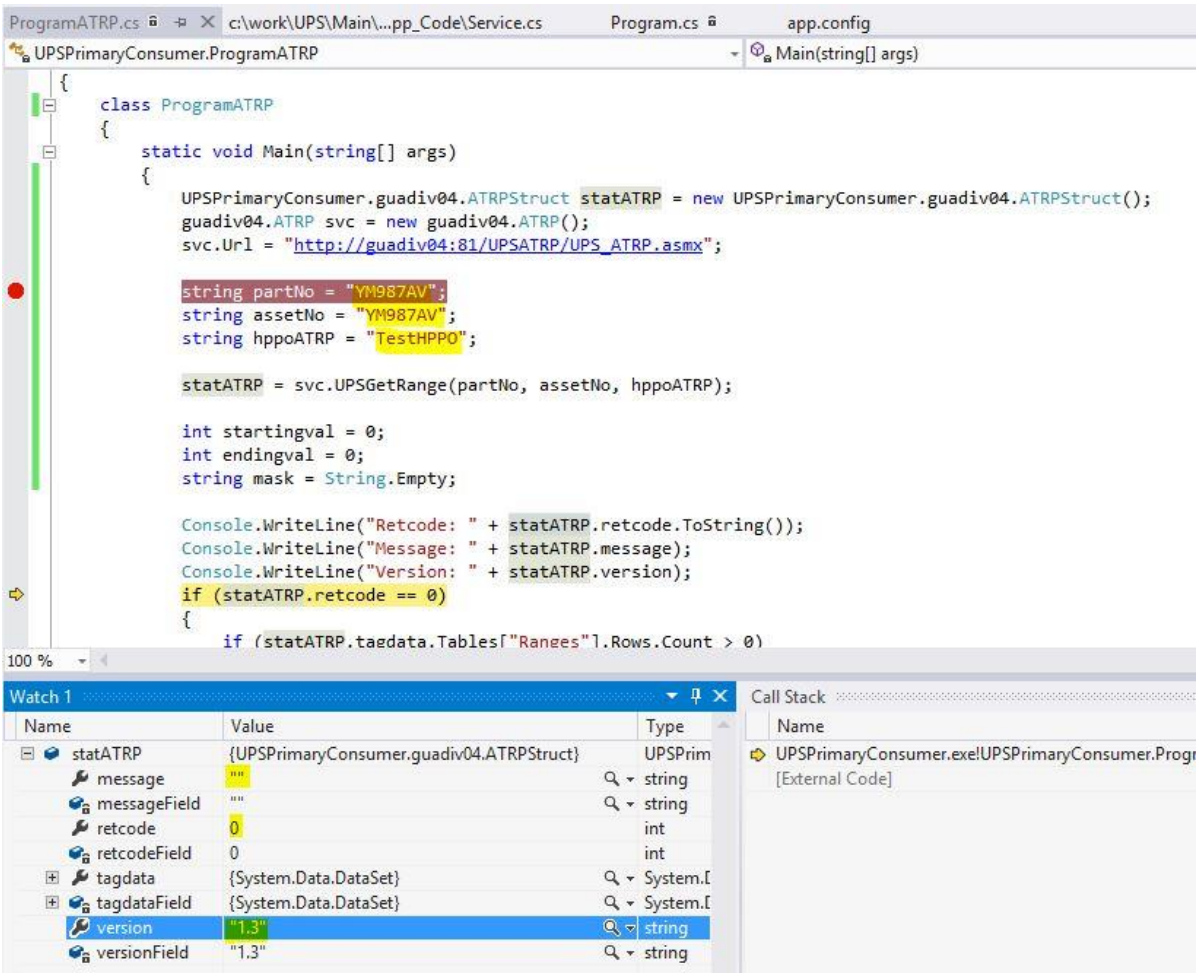
Picture 1: Part Number

The aboive screen shot, Picture 1, the Part Number for the *Test Customer* (selected in the left window pane) used for the demonstration is highlighted in yellow color – *YM987AV*.

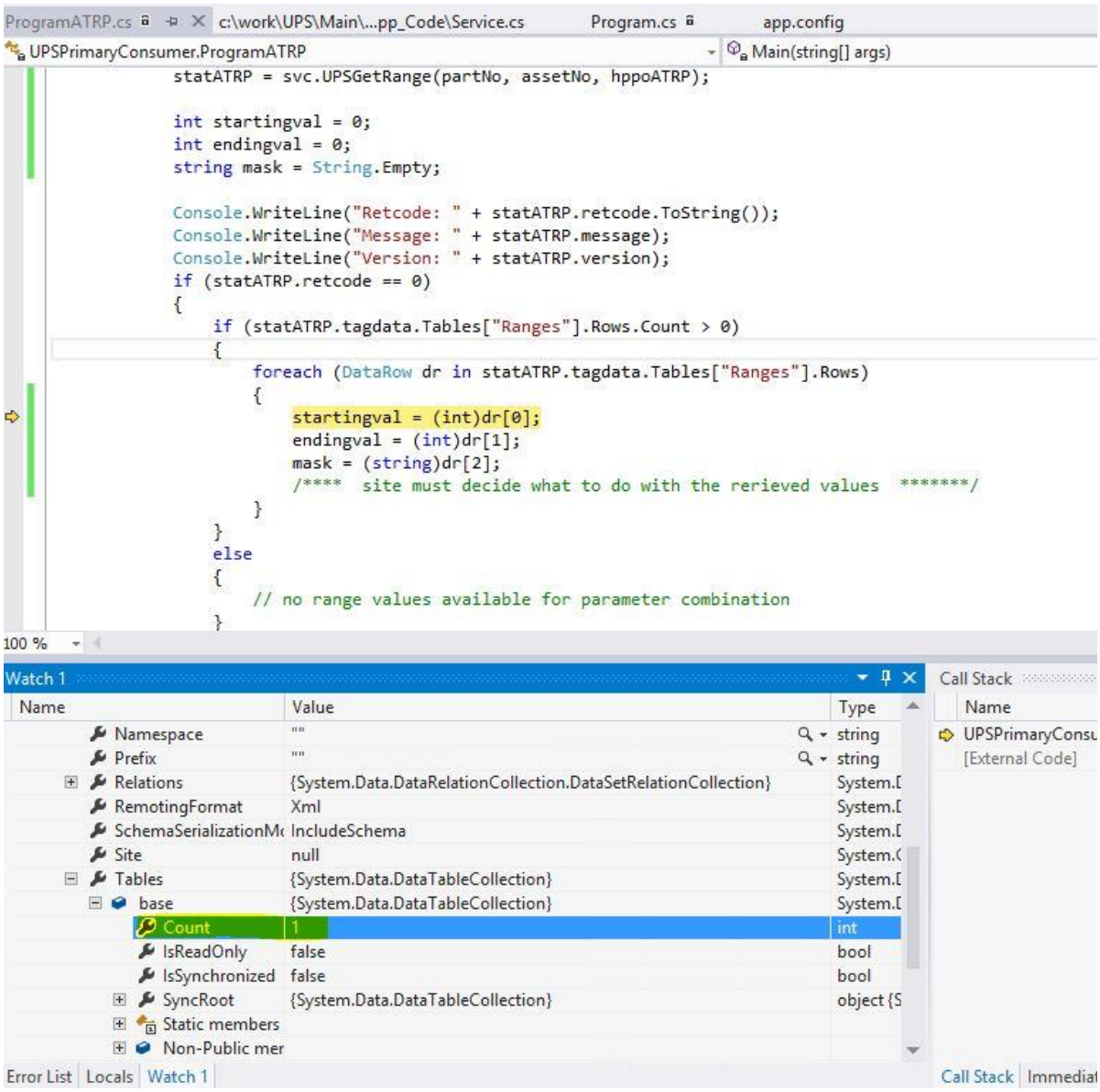


Picture 2: Asset Number and HPPO

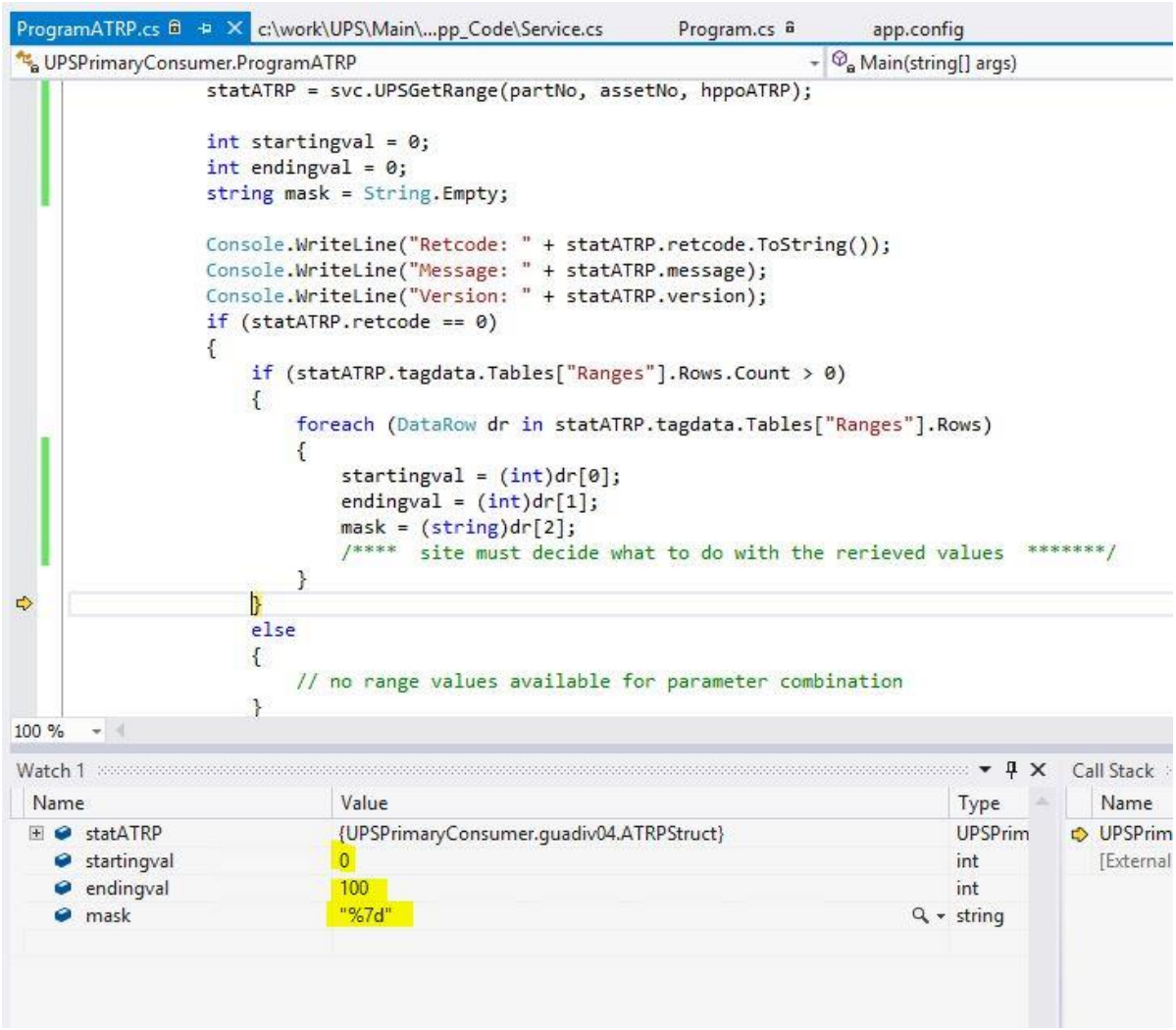
Step 2: Execute the UPSGetRange method



Picture 3: Service makes the call using the parameters highlighted in previous pictures (1 & 2), the method will return message, retcode, tagdata and version (also highlighted).



Picture 4: Let's loop through the Range DataSet, it will basically contain one row for the current example



Picture 5: After iterating through the Range DataSet, the start value, ending value and mask are obtained.

Enhancement

The feature to export the assigned range of asset numbers for external transmission is under consideration. Further scoping discussions with the manufacturing sites will provide the basis for a more efficient solution.

Summary

This document provides a brief description on the use of a proposed feature in the UPS solution for manufacturing sites – Retrieve Asset Number list. This feature will permit manufacturing sites to ramp up quickly on behalf of HP to deliver asset tag services to global customers. The UPS team cannot guarantee the delivery of any proposed feature without further consultation with the business teams responsible for delivery of the services. The manufacturing sites will have to integrate their current shop floor system to this new feature. There are many additional features in the UPS solution that can assist the manufacturer to improve its TAT and Quality. Analysis of these features and their corresponding integration into the shop floor computer application can occur after the initial adoption of UPS at the manufacturing site.

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