# 3.1.4 Message Processing Events and Sequencing Rules

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An implementation of the Print System Asynchronous Remote Protocol MUST indicate the following to the remote procedure call (RPC) runtime ([MS-RPCE] section 3).

- Perform a strict NDR data consistency check at target level 6.0.
- Reject a NULL unique or full pointer with nonzero conformant value.
- Using the **strict_context_handle** attribute ([MS-RPCE] section 2.2.4.15), reject the use of context handles that are created by the methods of a different RPC interface.

The methods that are defined by this protocol are grouped into functional categories, and their syntax and behavior are specified in sections, as shown in the following table. Most methods described in these sections have functional equivalents in the Print System Remote Protocol ([MS-RPRN] section 3.1.4).

Expand table

| Functional category | Description | Section |
|---|---|---|
| Printer management | Methods used for discovering and obtaining access to supported printers. | 3.1.4.1 |
| Printer driver management | Methods for discovering and installing printer drivers. | 3.1.4.2 |
| Printer port management | Methods for discovering and communicating with printer ports. | 3.1.4.3 |
| Print-processor management | Methods for discovering and manipulating print-processor objects. | 3.1.4.4 |
| Port monitor management | Methods for discovering and installation of port monitor modules. | 3.1.4.5 |
| Form management | Methods for discovering and configuring printer forms. | 3.1.4.6 |
| Job management | Methods for discovering, defining, and scheduling print jobs. | 3.1.4.7 |
| Job printing | Methods for adding documents, pages, and data to print jobs. | 3.1.4.8 |
| Printing-related notifications | Methods for obtaining notifications of printing events. | 3.1.4.9 |
| Job named property management | Methods for creating, updating, deleting, and enumerating **Job Named Properties** (section 3.1.1).<9> | 3.1.4.10 |
| Branch office print remote logging | Methods for processing **Branch Office Print Remote Log Entries** (section 3.1.1).<10> | 3.1.4.11 |

The following table lists all the methods of the Print System Asynchronous Remote Protocol in ascending order of their opnums.

Methods in RPC opnum order:

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| Method | Description |
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| RpcAsyncOpenPrinter | **RpcAsyncOpenPrinter** retrieves a handle to a specified printer, port, print job or print server. A client uses this method to obtain a print handle to an existing printer on a remote computer.<br><br>The counterpart of this method in the Print System Remote Protocol is **RpcOpenPrinterEx**. All parameters not defined below are specified in [MS-RPRN] section 3.1.4.2.14.<br><br>Opnum: 0 |
| RpcAsyncAddPrinter | **RpcAsyncAddPrinter** installs a printer on the print server.<br><br>The counterpart of this method in the Print System Remote Protocol is **RpcAddPrinterEx**. All parameters not defined below are specified in [MS-RPRN] section 3.1.4.2.15.<br><br>Opnum: 1 |
| RpcAsyncSetJob | RpcAsyncSet**Job** pauses, resumes, cancels, or restarts a print job on a specified printer. This method also can set print job parameters, including the job priority and document name.<br><br>Opnum: 2 |
| RpcAsyncGetJob | RpcAsyncGet**Job** retrieves information about a specified print job on a specified printer.<br><br>Opnum: 3 |
| RpcAsyncEnumJobs | **RpcAsyncEnumJobs** retrieves information about a specified set of print jobs on a specified printer.<br><br>Opnum: 4 |
| RpcAsyncAddJob | **RpcAsyncAddJob** returns **ERROR_INVALID_PARAMETER**.<br><br>Opnum: 5 |
| RpcAsyncScheduleJob | **RpcAsyncScheduleJob** returns **ERROR_SPL_NO_ADDJOB**.<br><br>Opnum: 6 |
| RpcAsyncDeletePrinter | **RpcAsyncDeletePrinter** deletes the specified printer object.<br><br>The client MUST call **RpcAsyncClosePrinter** (section 3.1.4.1.10) with the same **PRINTER_HANDLE** after calling this method.<br><br>Opnum: 7 |
| RpcAsyncSetPrinter | **RpcAsyncSetPrinter** sets the state of a specified printer.<br><br>Opnum: 8 |
| RpcAsyncGetPrinter | **RpcAsyncGetPrinter** retrieves information about a specified printer.<br><br>Opnum: 9 |
| RpcAsyncStartDocPrinter | **RpcAsyncStartDocPrinter** notifies a specified printer that a document is being spooled for printing.<br><br>Opnum: 10 |
| RpcAsyncStartPagePrinter | **RpcAsyncStartPagePrinter** notifies a specified printer that a page is about to be printed.<br><br>Opnum: 11 |

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| RpcAsyncWritePrinter | **RpcAsyncWritePrinter** adds data to the file representing the spool file for a specified printer, if the spooling option is turned on; or it sends data to the device directly, if the printer is configured for direct printing.<br><br>Opnum: 12 |
| RpcAsyncEndPagePrinter | **RpcAsyncEndPagePrinter** notifies a specified printer that the application is at the end of a page in a print job.<br><br>Opnum: 13 |
| RpcAsyncEndDocPrinter | **RpcAsyncEndDocPrinter** signals the completion of the current print job on a specified printer.<br><br>Opnum: 14 |
| RpcAsyncAbortPrinter | **RpcAsyncAbortPrinter** aborts the current document on a specified printer.<br><br>Opnum: 15 |
| RpcAsyncGetPrinterData | **RpcAsyncGetPrinterData** retrieves configuration data from a specified printer or print server.<br><br>Opnum: 16 |
| RpcAsyncGetPrinterDataEx | **RpcAsyncGetPrinterDataEx** retrieves configuration data for the specified printer or print server. This method extends **RpcAsyncGetPrinterData** (section 3.1.4.1.6) and can retrieve values stored under a specified key by **RpcAsyncSetPrinterDataEx** (section 3.1.4.1.9).<br><br>Opnum: 17 |
| RpcAsyncSetPrinterData | **RpcAsyncSetPrinterData** sets the configuration data for a printer or print server.<br><br>Opnum: 18 |
| RpcAsyncSetPrinterDataEx | **RpcAsyncSetPrinterDataEx** sets the configuration data for a printer or print server. This method is similar to **RpcAsyncSetPrinterData** (section 3.1.4.1.8) but also allows the caller to specify the registry key under which to store the data.<br><br>Opnum: 19 |
| RpcAsyncClosePrinter | **RpcAsyncClosePrinter** closes a handle to a printer object, server object, job object, or port object, which is opened by calling **RpcAsyncOpenPrinter** (section 3.1.4.1.1) or **RpcAsyncAddPrinter** (section 3.1.4.1.2).<br><br>Opnum: 20 |
| RpcAsyncAddForm | **RpcAsyncAddForm** adds a form name to the list of supported forms.<br><br>Opnum: 21 |
| RpcAsyncDeleteForm | **RpcAsyncDeleteForm** removes a form name from the list of supported forms.<br><br>Opnum: 22 |
| RpcAsyncGetForm | **RpcAsyncGetForm** retrieves information about a specified form.<br><br>Opnum: 23 |
| RpcAsyncSetForm | **RpcAsyncSetForm** sets the form information for the specified printer.<br><br>Opnum: 24 |

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| RpcAsyncEnumForms | **RpcAsyncEnumForms** enumerates the forms that the specified printer supports.<br><br>Opnum: 25 |
| RpcAsyncGetPrinterDriver | **RpcAsyncGetPrinterDriver** retrieves data about a specified printer driver on a specified printer.<br><br>Opnum: 26 |
| RpcAsyncEnumPrinterData | **RpcAsyncEnumPrinterData** enumerates configuration data for a specified printer.<br><br>Opnum: 27 |
| RpcAsyncEnumPrinterDataEx | **RpcAsyncEnumPrinterDataEx** enumerates all value names and data for a specified printer and key. This method extends **RpcAsyncEnumPrinterData** (section 3.1.4.1.11) by retrieving several values in a single call.<br><br>Opnum: 28 |
| RpcAsyncEnumPrinterKey | **RpcAsyncEnumPrinterKey** enumerates the subkeys of a specified key for a specified printer.<br><br>Opnum: 29 |
| RpcAsyncDeletePrinterData | **RpcAsyncDeletePrinterData** deletes a specified value from the configuration of a specified printer.<br><br>Opnum: 30 |
| RpcAsyncDeletePrinterDataEx | **RpcAsyncDeletePrinterDataEx** deletes a specified value from the configuration of a specified printer. This method is similar to **RpcAsyncDeletePrinterData** (section 3.1.4.1.14) but accesses the configuration data using a set of named and typed values that are stored in a hierarchy of registry keys.<br><br>Opnum: 31 |
| RpcAsyncDeletePrinterKey | **RpcAsyncDeletePrinterKey** deletes a specified key and all its subkeys from the configuration of a specified printer.<br><br>Opnum: 32 |
| RpcAsyncXcvData | **RpcAsyncXcvData** provides the means by which a port monitor client component can communicate with its server-side counterpart, the actual port monitor that is hosted by the server.<br><br>Opnum: 33 |
| RpcAsyncSendRecvBidiData | **RpcAsyncSendRecvBidiData** sends and receives bidirectional data. This method is used to communicate with print monitors that support such data.<br><br>Opnum: 34 |
| RpcAsyncCreatePrinterIC | **RpcAsyncCreatePrinterIC** creates an information context on a specified printer.<br><br>Opnum: 35 |
| RpcAsyncPlayGdiScriptOnPrinterIC | **RpcAsyncPlayGdiScriptOnPrinterIC** queries fonts for printer connections.<br><br>Opnum: 36 |
| RpcAsyncDeletePrinterIC | **RpcAsyncDeletePrinterIC** deletes a printer information context.<br><br>Opnum: 37 |
| RpcAsyncEnumPrinters | **RpcAsyncEnumPrinters** enumerates available local printers, printers on a specified print server, printers in a specified |

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| | domain, or print providers.<br><br>Opnum: 38 |
| RpcAsyncAddPrinterDriver | **RpcAsyncAddPrinterDriver** installs a specified local or a remote printer driver on a specified print server, and it links the configuration, data, and driver files.<br><br>Opnum: 39 |
| RpcAsyncEnumPrinterDrivers | **RpcAsyncEnumPrinterDrivers** enumerates the printer drivers installed on a specified print server.<br><br>Opnum: 40 |
| RpcAsyncGetPrinterDriverDirectory | **RpcAsyncGetPrinterDriverDirectory** retrieves the path of the printer-driver directory on a specified print server.<br><br>Opnum: 41 |
| RpcAsyncDeletePrinterDriver | **RpcAsyncDeletePrinterDriver** removes the specified printer driver from the list of supported drivers for a specified print server.<br><br>Opnum: 42 |
| RpcAsyncDeletePrinterDriverEx | **RpcAsyncDeletePrinterDriverEx** removes the specified printer driver from the list of supported drivers on a specified print server, and deletes the files associated with the driver. This method is similar to **RpcAsyncDeletePrinterDriver** (section 3.1.4.2.5) but can also delete specific versions of the driver.<br><br>Opnum: 43 |
| RpcAsyncAddPrintProcessor | **RpcAsyncAddPrintProcessor** installs a specified print processor on the specified server and adds its name to an internal list of supported print processors.<br><br>Opnum: 44 |
| RpcAsyncEnumPrintProcessors | **RpcAsyncEnumPrintProcessors** enumerates the print processors installed on a specified server.<br><br>Opnum: 45 |
| RpcAsyncGetPrintProcessorDirectory | **RpcAsyncGetPrintProcessorDirectory** retrieves the path for the print processor on the specified server.<br><br>Opnum: 46 |
| RpcAsyncEnumPorts | **RpcAsyncEnumPorts** enumerates the ports that are available for printing on a specified server.<br><br>Opnum: 47 |
| RpcAsyncEnumMonitors | **RpcAsyncEnumMonitors** retrieves information about the port monitors installed on a specified server.<br><br>Opnum: 48 |
| RpcAsyncAddPort | **RpcAsyncAddPort** adds a specified port name to the list of supported ports on a specified server.<br><br>Opnum: 49 |
| RpcAsyncSetPort | **RpcAsyncSetPort** sets the status associated with a specified port on a specified print server.<br><br>Opnum: 50 |
| RpcAsyncAddMonitor | **RpcAsyncAddMonitor** installs a specified local port monitor, and links the configuration, data, and monitor files on a specified print server.<br><br>Opnum: 51 |

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| RpcAsyncDeleteMonitor | **RpcAsyncDeleteMonitor** removes a specified port monitor from a specified print server.<br><br>Opnum: 52 |
| RpcAsyncDeletePrintProcessor | **RpcAsyncDeletePrintProcessor** removes a specified print processor from a specified server.<br><br>Opnum: 53 |
| RpcAsyncEnumPrintProcessorDatatypes | **RpcAsyncEnumPrintProcessorDatatypes** enumerates the data types that a specified print processor supports.<br><br>Opnum: 54 |
| RpcAsyncAddPerMachineConnection | **RpcAsyncAddPerMachineConnection** persistently saves the configuration information for a connection, including the print server name and the name of the print providers for a specified connection.<br><br>Opnum: 55 |
| RpcAsyncDeletePerMachineConnection | **RpcAsyncDeletePerMachineConnection** deletes the stored connection configuration information that corresponds to the *pPrinterName* parameter value.<br><br>Opnum: 56 |
| RpcAsyncEnumPerMachineConnections | **RpcAsyncEnumPerMachineConnections** enumerates each of the per-machine connections into a specified buffer.<br><br>Opnum: 57 |
| RpcSyncRegisterForRemoteNotifications | **RpcSyncRegisterForRemoteNotifications** opens a notification handle by using a printer handle or print server handle, to listen for remote printer change notifications.<br><br>Opnum: 58 |
| RpcSyncUnRegisterForRemoteNotifications | **RpcSyncUnRegisterForRemoteNotifications** closes a notification handle that is opened by calling **RpcSyncRegisterForRemoteNotifications** (section 3.1.4.9.1).<br><br>Opnum: 59 |
| RpcSyncRefreshRemoteNotifications | **RpcSyncRefreshRemoteNotifications** gets notification information for all requested members. This is called by a client if the "RemoteNotifyData Flags" property in the **RpcPrintPropertiesCollection** (section 2.2.4) instance, which was returned as part of the notification from an **RpcAsyncGetRemoteNotifications** (section 3.1.4.9.4) call, has the **PRINTER_NOTIFY_INFO_DISCARDED** bit set ([MS-RPRN] section 2.2.3.2).<br><br>Opnum: 60 |
| RpcAsyncGetRemoteNotifications | **RpcAsyncGetRemoteNotifications** is used to poll the print server for specified change notifications. A call to this method is suspended until the server has a new change notification for the client. Subsequently, the client calls this method again to poll for additional notifications from the server.<br><br>Opnum: 61 |
| RpcAsyncInstallPrinterDriverFromPackage | **RpcAsyncInstallPrinterDriverFromPackage** installs a printer driver from a driver package.<br><br>Opnum: 62 |
| RpcAsyncUploadPrinterDriverPackage | **RpcAsyncUploadPrinterDriverPackage** uploads a driver package so it can be installed with the **RpcAsyncInstallPrinterDriverFromPackage** method (section 3.1.4.2.7). |

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| | Opnum: 63 |
| RpcAsyncGetCorePrinterDrivers | **RpcAsyncGetCorePrinterDrivers** retrieves the globally unique identifier (GUID), the version, the date of the specified core printer drivers, and the path to their packages.<br><br>Opnum: 64 |
| RpcAsyncCorePrinterDriverInstalled | **RpcAsyncCorePrinterDriverInstalled** determines if a specific core printer driver is installed.<br><br>Opnum: 65 |
| RpcAsyncGetPrinterDriverPackagePath | **RpcAsyncGetPrinterDriverPackagePath** gets the path to the specified printer driver package.<br><br>Opnum: 66 |
| RpcAsyncDeletePrinterDriverPackage | **RpcAsyncDeletePrinterDriverPackage** deletes a specified printer driver package.<br><br>Opnum: 67 |
| RpcAsyncReadPrinter | **RpcAsyncReadPrinter** retrieves data from the specified job object.<br><br>Opnum: 68 |
| RpcAsyncResetPrinter | **RpcAsyncResetPrinter** resets the data type and device mode values to use for printing documents that are submitted by the **RpcAsyncStartDocPrinter** method (section 3.1.4.8.1).<br><br>Opnum: 69 |
| RpcAsyncGetJobNamedPropertyValue | **RpcAsyncGetJobNamedPropertyValue** retrieves the value of the specified **Job Named Property** (section 3.1.1) for the specified print job.<br><br>Opnum: 70 |
| RpcAsyncSetJobNamedProperty | **RpcAsyncSetJobNamedProperty** creates a new **Job Named Property** or changes the value of an existent **Job Named Property** for the specified print job.<br><br>Opnum: 71 |
| RpcAsyncDeleteJobNamedProperty | **RpcAsyncDeleteJobNamedProperty** deletes a **Job Named Property** for the specified print job.<br><br>Opnum: 72 |
| RpcAsyncEnumJobNamedProperties | **RpcAsyncEnumJobNamedProperties** enumerates the **Job Named Properties** for the specified print job.<br><br>Opnum: 73 |
| RpcAsyncLogJobInfoForBranchOffice | **RpcAsyncLogJobInfoForBranchOffice** processes one or more **Branch Office Print Remote Log Entries** (section 3.1.1) by writing them to the Microsoft-Windows-PrintService/Admin and Microsoft-Windows-PrintService/Operations event channels.<br><br>Opnum: 74 |

All methods defined in this protocol are request/response RPC methods. Each method returns either an HRESULT value ([MS-ERREF] section 2.1) or a **Win32** code ([MS-ERREF] section 2.2).

A non-negative HRESULT return value indicates successful completion, and a negative value indicates failure. A Win32 return value of zero indicates successful completion, and a nonzero value indicates failure, with the following exceptions.

The **ERROR_MORE_DATA** and **ERROR_INSUFFICIENT_BUFFER** Win32 codes defined in the table have specific meanings in this protocol. When a method has an output parameter that returns a required buffer size, the method can return one of these errors.

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| Name/Value | Meaning |
|---|---|
| ERROR_INSUFFICIENT_BUFFER<br>0x0000007A | The buffer size specified in a method call is too small. |
| ERROR_MORE_DATA<br>0x000000EA | More data is available. |

The caller SHOULD NOT treat these return values as errors. The caller SHOULD use the buffer size returned by the method to resize the buffers, and it SHOULD call the method again using the resized buffers. These cases are noted in the method definitions in this section and in their corresponding definitions in [MS-RPRN] section 3.1.4.