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# Introduction

## Purpose

The Function (Group) Specification (FS) specifies an individual function / a group of functions.

To get more information about the concept of feature, function and component level abstraction refer to the Ford RE Wiki.

## Scope

The following set of functions from the Global Feature & Function List is described in this specification.

|  |  |  |  |
| --- | --- | --- | --- |
| **Function ID** | **Function Name** | **Owner** | **Reference** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Table 1: Functions described in this specification

## Audience

### Stakeholder List

For the latest list of the feature stakeholder and their roles & responsibilities refer to <Put VSEM Link here>.

|  |  |
| --- | --- |
| **Role** | **Name** |
| Ford in House IVI Software Technical Leader | Michael Alievsky |
| IVSU Product Supervisor | Brunilda Caushi |
| Vector OTA App Lead | Marco Wierer |
| VBF Spec Technical Lead | Jason Miller |
| Diff Generator Requirements Author | Ali Suleiman |
| Wind River Diff Generator | Piotr Lauk |
| ECG/TCU software packaging and signing Technical Lead | Mirela Fonoage |
|  |  |

## References

### Ford Documents

List here all Ford internal documents, which are directly related to the feature.

|  |  |  |  |
| --- | --- | --- | --- |
| **Reference** | **Title** | **Doc. ID** | **Revision** |
| [001] | Versatile Binary Format Specification 3.1 | VBF-00.06.15.004-008 |  |
| [002] | Data Compression and Encryption Specification | 00.06.15.005-003 (002) |  |
| [004] | ECG/TCU software packaging and signing (draft) See attachments |  |  |
| [008] | VBF 3.1 Test Specification See attachments |  |  |
|  |  |  |  |

Table 2: Ford Documents

## Terminology

### Definitions

|  |  |
| --- | --- |
| Definition | Description |
| Target | The location where the update will be installed, this terminology will be found in the Wind River Documentation. This is where the final result of applying a patch will ultimately result. |
| Source | The source is the prior software which the differential update will be applied to. |
| Destination | Another word for Target, this is the language used in the Manifest Manager and within Ford. |
| Diff | The difference between two files. |
| Differential Package | A package comprised of multiple differentials intended to service noncontiguous binary data. |
| Multiplicity | Multiplicity indicates what the valid number of occurences are for a field using the following the symbol:   |  |  | | --- | --- | | Symbol | Explanation | | 0 | Zero occurences | | 1 | One occurence | | ∞ | Many occurences | | , | Comma’s indicate a logical “OR” |   Examples:  “0,1, ∞” indicates zero, one, or many occurrences.  “0,1” indicates zero or one occurrences, this affectively means it is an optional field that only occurs a maximum of one time when present.. |
| Block | A block is a binary that can be referred to with a single start address or file path. |
| [TBD] | Any requirements that are marked TBD still require input in order to be implemented. |
|  |  |
|  |  |
|  |  |

Table 4: Definitions used in this document

### Abbreviations

|  |  |  |
| --- | --- | --- |
| Abbr. | Stands for | Description |
| FS | Function Requirements Specification /  Function Group Specification | The document describing, collecting and developing the requirements of a function or a group of functions. |
|  |  |  |
|  |  |  |
|  |  |  |

Table 5: Abbreviations used in this document.

# Function Group Description

## Overview

The Diff Generator is a service that creates differential software packages of Ford Formatted Software packages.

## Input Requirements

### FUR-REQ-328604/A-###R\_F\_DiffGen\_00038### Interfaces

The logical interfaces described in this requirements document shall be implemented in addition to the those defined in EdgeSyncDifferentialGeneratorApiDocumentation-3.1.0 [003]

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00038###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

### FUR-REQ-328605/A-###R\_F\_DiffGen\_00039### Internal Interfaces

Internal interfaces shall be implemented and defined and detailed by the supplier who implements this specification.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00039###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

### FUR-REQ-328606/A-###R\_F\_DiffGen\_00040### VBF Format

This specification is intended to be implement along with consideration of the referenced VBF Specification [001]. This specification is required for parsing, packing, and unpacking VBF’s and all documents referenced within referenced documents are also to be taken into consideration during implementation alongside this specification.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00040###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

### FUR-REQ-328607/A-###R\_F\_DiffGen\_00041### File Based Software Package Format

The details of the File based software packages are described in detail in ECG/TCU software packaging and signing [004], and output file based Differential Package shall follow the format defined there in [004].

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00041###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

### FUR-REQ-328608/A-###R\_F\_DiffGen\_00059### OVTP software signing

OVTP based software shall be signed prior to being sent to the Diff Generator, and the Diff Generator will process the VSA as an ordinary data block.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00059###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

## Assumptions & Constraints

# Functional Architecture



Figure 1: Diff Generator – Functional Architecture

## Function List

### List of Logical Functions

|  |  |  |
| --- | --- | --- |
| **Function ID** | **Function Name** | **Function Description** |
| F1 | Diff Generator | Function that delegates to File based Diff Generation, and OVTP Diff Generation. |
| F2 | File Based Diff Generator | Function responsible for creating differential packages between a destination and source package intended for File system based SOCs |
| F3 | OVTP Diff Generator | Function responsible for creating differential packages between destination and source packages for modules without File systems and OVTP Capable. |
| F4 | Console Tools | Tool used for confirming that a software patch works correctly. This used for validating patches and not the meta data such as address etc. |
| E1 | VADR | Vehicle Application & Domain Release |
| E2 | Tester CLI | Test Command Line |

Table 6: List of Logical Functions

|  |  |  |  |
| --- | --- | --- | --- |
| **Function ID** | **Function Name** | **F** | **WR** |
| F1 | Diff Generator |  | X |
| F2 | File Based Diff Generator |  | X |
| F3 | OVTP Diff Generator |  | X |
| E1 | VADR | X |  |

FIHS – Ford In House Software

WR – Wind River

F –Ford

X – Implementation

I –Interface Definition

Table 7: Function Implementation Guide

# Logical Functions

## Diff Generator

### Function Description

The Diff Generator is a cloud service that is called by other cloud services to create differential software packages based on Fords File Formats. Currently there are File system based software packages and OVTP software packages. The Diff Generator serves as the main interface to other cloud services including VADR.

### Function Interfaces

#### Logical Inputs

|  |  |  |
| --- | --- | --- |
| Signal ID | Signal Name | Description |
| 00001 | API Diff Request | This consists of Source pointer, Destination pointer, and Correlation ID. Binaries may be signed, Plugin Version, optional Timeout, and Erase Region for location   |  |  |  | | --- | --- | --- | | Fieldname | Description | Source | | Source pointer | Link to the Source Software Package | VADR | | Destination pointer | Link to the Destination Software Package | VADR | | Plugin Version | Version of Diff Updater that will be used on the vehicle for the update. | Software Provider | | optional Timeout | Maximum amount of time the Diff Generator can take to create the diff update. | VADR | | Erase Region | Region of memory that must be cleared on the module prior to flashing the Diff Package. This consists a start address and a length. (Required for OVTP) | Software Provider | | Diff Package on Module Physical Address | This is the physical address of where the diff package will be stored on the ECU. (Required for OVTP)  For IVI modules, this address will be set to match the destination software VBF header. | Software Provider | | Request URL | This URL will be used to select between and SOC, or Diff Package update. This indicates whether the software package is File Based or OVTP ECU based. | Software Provider | |  |  |  | |
|  | Get Task by ID | See “4.4.6 Get diff task details” [007] |
|  | List Tasks by Status | See “4.4.5 List tasks by status” [007] |
|  | Upload File to Application Storage | This is the interface for uploading file to the application storage. This will be used for uploading the source and destination file, and will return a fileID on success. |
|  | Delete File by File ID | Request to Delete file by File ID. |
|  | Start Diff by Task ID | When this message is sent the Diff generation will begin for the Task ID. |

#### Logical Outputs

|  |  |  |
| --- | --- | --- |
| Signal ID | Signal Name | Description |
| 00002 | API Diff Response | This response includes Diff Task ID, and indicates that the request was received and is now pending. |
| 00003 | API Diff Result. | The asynchronous request includes Diff Task ID, File ID to Diff Package (unsigned). This message indicates the final result of the Diff Generation. This may be sent over a message queue.   |  |  | | --- | --- | | Field Name | Description | | Diff Task ID | The ID associated with the request. | | File ID | Reference used by VADR to access the File. The file formats are described in “LSG\_DiffGen\_00007” and “LSG\_DiffGen\_00006” | | Diff Task Status | See “4.4.5. List tasks by status” [007] | | Response Code | Reference code from the supplier API or the table in ###R\_F\_DiffGen\_00027. | | Response Message | Filled plain text template described in ###R\_F\_DiffGen\_00027. This field is also used for Warning messages. | |
|  | Upload File to Application Storage Confirmation |  |
|  | Delete File by File ID Confirmation |  |
|  | Start Diff by Task ID Confirmation |  |

#### Parameters

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | Diff Update Response Message Queue | This is a message queue used for sending back the final result of the Differential generation, and used for sending the message “API Diff Result”. |
|  | Retry times | A list of wait times, each indicating the amount of time to wait until reattempting to access a file id in seconds. For example:  [1,5,15,30,60] |

### Function Modeling



Figure 2: Sequence Diagram of Diff Generator

### Function Requirements

#### Functional Requirements

##### Normal Operation

###### FUR-REQ-328552/A-###R\_F\_DiffGen\_00025### General Operation

When the Diff Generator receives a request it shall determine whether the software package is an OVTP or File based package based on the request URL and send the request to the correct Diff Gen Sub Function, see F2 and F3 for additional details. Once the Diff generation is complete, the Diff generator shall respond with the result via “Diff Update Response Message Queue”.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00025###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328553/A-###R\_F\_DiffGen\_00048### Common requirements for IVI and OVTP Diff Generation

Requirements “R\_F\_DiffGen\_00002” through “R\_F\_DiffGen\_00010”, shall apply to the File based, and OVTP based diff generator.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00048###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328554/A-###R\_F\_DiffGen\_00002### VBF Version

The Diff generator shall check if VBF Version of the source and destination is greater than 3.1. If it is less then it shall return an error message to the requester. If the version is greater than 3.1, the diff generator shall carry over the version from the destination to the diff package VBF Header.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00002###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328555/A-###R\_F\_DiffGen\_00003### VBF Description

The VBF Description shall be copied from the destination VBF header to the Diff VBF header.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00003###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328556/A-###R\_F\_DiffGen\_00004### sw part number

The Software Part number in the Diff VBF shall consist of 2 entries, one for the source, and one for the destination. See [001] section 4.2.2.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00004###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328557/A-###R\_F\_DiffGen\_00005### Data Format Identifier

The Diff generator shall have a look up table for identifying what decompression method to use when preparing the source and destination file. It shall determine what methods to apply prior to generating a differential update. It will also use the method in the header the destination file for compressing the diff package. Currently there is only one format defined for VBF files, See [002] for details.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00005###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328558/A-###R\_F\_DiffGen\_00006### VBF Header information to be copied from destination VBF Header to Diff VBF Header

The Diff Generator shall copy Version, Description, sw\_part\_type, ecu\_address, frame\_format, ~~erase field values~~ to the Diff VBF Header fields.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00006###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328559/A-###R\_F\_DiffGen\_00007### Erase

When the Diff Generator is creating diff packages for OVTP modules it shall include the Erase blocks from the destination VBF header in the result diff package along with the one specified for the diff page in the interface call. When the request is made for IVI modules this parameter shall be excluded from the request.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00007###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328560/A-###R\_F\_DiffGen\_00008### Omit

The Diff generator shall ignore all destination blocks that are included in the Omit field and not consider them when creating a differential package.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00008###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328561/A-###R\_F\_DiffGen\_00009### VBF Headers to Ignore

The Diff Generator shall ignore fields: Call, verification\_structure\_address, sw\_signature, and public\_key\_hash.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00009###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328562/A-###R\_F\_DiffGen\_00010### file\_checksum

The diff generator shall validate file checksum prior to creating the diff package. If the checksum does not validate and error message shall be returned to the caller.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00010###** | | | | | | |
| **Rationale** | | | | | | |
| <Put any rationale here> | | | | | | |
| **Acceptance Criteria** | | | | | | **V&V Method** |
| <Put any acceptance criteria here> | | | | | | <TestCase trace link> |
| **Notes** | | | | | | |
| <Put any notes here> | | | | | | |
| **Type** | | Choose an item. | | **Source** | <Put any source here, which is not a requirement reference> | |
| **Priority** | | Choose an item. | | **Source Req.** | <Put any parent requirement trace link here> | |
| **Status** | | Choose an item. | | **Owner** |  | |
| **Change Log** | | | | | | |
| **Version** | **Date** | **Author** | **Change** | | | |
| 1 |  |  | Initial version | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

###### FUR-REQ-328563/A-###R\_F\_DiffGen\_00053### URL Based Mode Selection

The Diff Generator shall have 3 service URLs for selecting between three different modes.

* **SWU Agent Diff Package generation** intended file based Diff packages currently support on IVI modules.
* **ECU Diff package generation** intended for OVTP based ECUs.
* **Raw Binary Diff Generator**, for generating a single diff of an entire binary without parsing or unpacking any of it contents.

Raw binary does not have a function section in this specification, and intended to describe the already existing product used in out original bench marking, and will be used for performance testing in addition to the other modes listed in this requirement.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00053###** | | | | | | |
| **Rationale** | | | | | | |
| <Put any rationale here> | | | | | | |
| **Acceptance Criteria** | | | | | | **V&V Method** |
| <Put any acceptance criteria here> | | | | | | <TestCase trace link> |
| **Notes** | | | | | | |
| <Put any notes here> | | | | | | |
| **Type** | | Choose an item. | | **Source** | <Put any source here, which is not a requirement reference> | |
| **Priority** | | Choose an item. | | **Source Req.** | <Put any parent requirement trace link here> | |
| **Status** | | Choose an item. | | **Owner** |  | |
| **Change Log** | | | | | | |
| **Version** | **Date** | **Author** | **Change** | | | |
| 1 |  |  | Initial version | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### Error Handling

###### FUR-REQ-328591/A-###R\_F\_DiffGen\_00027### Diff Response Messages

The diff generator shall return the following error messages when the conditions are met and also return a Diff Package URL for Warning responses, and Error Responses. In addition reserved code 510-740 shall be returned based on VBF 3.1 Test Specification[008].

|  |  |  |  |
| --- | --- | --- | --- |
| Code | Message | Condition | Action |
| 0 | Success | Successfully generated Differential Package. | Success Response |
| 501 | Diff not allowed on SBL or GBL found in <package name> | SBL and GBL cannot be diffed as they are stored in RAM. This is based on the “sw\_part\_type” | Error Response |
| 502 | Manifest parse error in <package name> | If Manifest doesn’t match JSON schema in a file base software package this error is returned. | Error Response |
| 503 | Reserved | Reserved | Error Response |
| 504 | Checksum of <filename> failed in <package name> | The checksum of the file inside of the package failed. | Error Response |
| 505 | Reserved | Reserved | Error Response |
| 48 | Timeout: Diff generation took longer than <max time> | Diff Generation took longer then allowed time. | Error Response |
| 44 | Cannot find file: <filePath> | "Cannot find file: <filePath>” | Error Response |
| 57 | “Selected Differ plugin: <pluginName> <pluginVersion> is currently not supported or installed on machine” | Unsupported plugin version in the request. | Error Response |
| 508 | Invalid Erase Region for Diff package. | Apply test 160 from VBF 3.1 Test Specification. | Error Response |
| 509 | Invalid Address for Storing Diff Package on Module | Start address (first four bytes in each block) is not in range “≥ 0 and ≤  0xFFFFFFFF” | Error Response |
| 511-749 | Reserved for VBF Validation Errors | See VBF 3.1 Test Specification. For example, test case 10-1 maps to 511, and 240-3 maps to 743. | Error Response |
| 750-INF | Additional Messages | All other codes are useable by Developer or Maybe request by Ford. | Success, Warning, or Error Response. |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00027###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328592/A-###R\_F\_DiffGen\_00029### Diff generation time out

When the Diff Generator takes more time then the max allotted time in the request it shall respond with a timeout message.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00029###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328593/A-###R\_F\_DiffGen\_00030### Plugin for Format not available.

When the Diff Generator encounters a format that it doesn’t have a Diff plugin for it shall treat it as a binary Diff response with a warning and the resulting Diff package. This requirement applies to file based software packages with embedded JSON manifest.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00030###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328591/A-###R\_F\_DiffGen\_00027### Diff Response Messages

The diff generator shall return the following error messages when the conditions are met and also return a Diff Package URL for Warning responses, and Error Responses. In addition reserved code 510-740 shall be returned based on VBF 3.1 Test Specification[008].

|  |  |  |  |
| --- | --- | --- | --- |
| Code | Message | Condition | Action |
| 0 | Success | Successfully generated Differential Package. | Success Response |
| 501 | Diff not allowed on SBL or GBL found in <package name> | SBL and GBL cannot be diffed as they are stored in RAM. This is based on the “sw\_part\_type” | Error Response |
| 502 | Manifest parse error in <package name> | If Manifest doesn’t match JSON schema in a file base software package this error is returned. | Error Response |
| 503 | Reserved | Reserved | Error Response |
| 504 | Checksum of <filename> failed in <package name> | The checksum of the file inside of the package failed. | Error Response |
| 505 | Reserved | Reserved | Error Response |
| 48 | Timeout: Diff generation took longer than <max time> | Diff Generation took longer then allowed time. | Error Response |
| 44 | Cannot find file: <filePath> | "Cannot find file: <filePath>” | Error Response |
| 57 | “Selected Differ plugin: <pluginName> <pluginVersion> is currently not supported or installed on machine” | Unsupported plugin version in the request. | Error Response |
| 508 | Invalid Erase Region for Diff package. | Apply test 160 from VBF 3.1 Test Specification. | Error Response |
| 509 | Invalid Address for Storing Diff Package on Module | Start address (first four bytes in each block) is not in range “≥ 0 and ≤  0xFFFFFFFF” | Error Response |
| 511-749 | Reserved for VBF Validation Errors | See VBF 3.1 Test Specification. For example, test case 10-1 maps to 511, and 240-3 maps to 743. | Error Response |
| 750-INF | Additional Messages | All other codes are useable by Developer or Maybe request by Ford. | Success, Warning, or Error Response. |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00027###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328592/A-###R\_F\_DiffGen\_00029### Diff generation time out

When the Diff Generator takes more time then the max allotted time in the request it shall respond with a timeout message.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00029###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328593/A-###R\_F\_DiffGen\_00030### Plugin for Format not available.

When the Diff Generator encounters a format that it doesn’t have a Diff plugin for it shall treat it as a binary Diff response with a warning and the resulting Diff package. This requirement applies to file based software packages with embedded JSON manifest.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00030###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

#### Non-Functional Requirements

##### FUR-REQ-328587/A-###R\_F\_DiffGen\_00031### API Diff Request Minimum Response Time

The API must provide receipt of the request in less than 3 seconds.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00031###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

##### FUR-REQ-328588/A-###R\_F\_DiffGen\_00043### Max Diff Size Performance

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00043###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

##### FUR-REQ-328589/A-###R\_F\_DiffGen\_00044### Interface Format

All requests and responses between the client and diff generator shall be encoded in JSON.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00044###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

##### FUR-REQ-328590/A-###R\_F\_DiffGen\_00049### Retry when File ID is not available

When a fileid is not available, it shall follow a list of retry wait times provide as a configurable parameter.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00049###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

## File Based Diff Generator

### Function Description

The File based Diff Generator shall create Differential software packages intended for modules which File Systems.

### Function Interfaces

#### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | File based Diff Request | VBF package that contains 1 or more data blocks, Inside one of those blocks is a manifest file, a signature file, and all items references in the manifest |
|  |  |  |

#### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | Diff Complete | The asynchronous request includes Request ID, Pointer to Diff Package (unsigned). This message indicates the final result of the Diff Generation. |
|  | Diff Response | This response includes Request ID, Correlation ID, and indicates that the request was received and is now pending. |
|  |  |  |

### Function Modeling



Figure 3: File Based Diff Generator Flow Chart

### Function Requirements

#### Functional Requirements

##### Normal Operation

###### FUR-REQ-328564/A-###R\_F\_DiffGen\_00035### File Base Diff General Operation

When the File Based Diff Generator receives a request with a source and target file based software package it it shall do the following steps:

1. Unpack the file contents from the VBF files for the Source and Destination Software Package, along with the Manifest and Signature. The contents of the signature are ignored, but a field will be included in the resulting Differential package for the signature as a place holder.
2. Get the next File from the Destination software package referenced in the Destination Software Package Manifest.
3. If the “allowDiff” Flag is set to False, the Destination File entry in the manifest and the File are copied over to the Diff Package as is. Proceed to step 7.
4. If the Destination File has a matching entry in the source package with the same checksum and “allowDiff” is set to “True”, it shall be omitted from the Diff Package, the Module Installer will carry over the unchanged file during the software update. Proceed to step 7.
5. If a matching entry is found with a different checksum and a Diff of the corresponding files is smaller than the destination file, than the diff shall be added to the diff package along with a new calculated Checksum, and the format field shall be populated set to “DIFF”. Proceed to step 7.
6. If a Source File that matches the Destination File within the source manifest cannot be found. then the Destination File entry and File shall be added to the Diff Package as is without Creating a Diff because it is a new file.
7. The steps 2-6 are repeated until there are no more files in the destination to be handled.
8. Once all files in the destination have been processed, all contents are packed into a VBF where each file is stored in a separate data block. The contents of the header are then updated, and this result is returned back to the caller.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00035###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328566/A-###R\_F\_DiffGen\_00021### VBF wrapped File Based Update Format

The File Based Software Format for updating modules with File Systems is defined in ECG/TCU software packaging and signing attachment [004]. Also see logical signal “IVI Module VBF structure”

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00021###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328567/A-###R\_F\_DiffGen\_00033### Creating Differential Updates of Compressed Files

The Differential Generator shall decompress all compressed files referenced in the software package manifest prior to generating a Diff. This will result in a diff between the two uncompressed files.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00033###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328568/A-###R\_F\_DiffGen\_00034### Support for decompressing files

The Differential Generator shall support decompressing the following formats: ZIP, GZIP, and Bz2, when they are referenced in the Software Package Manifest.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00034###** | | | | | | |
| **Rationale** | | | | | | |
| <Put any rationale here> | | | | | | |
| **Acceptance Criteria** | | | | | | **V&V Method** |
| <Put any acceptance criteria here> | | | | | | <TestCase trace link> |
| **Notes** | | | | | | |
| <Put any notes here> | | | | | | |
| **Type** | | Choose an item. | | **Source** | <Put any source here, which is not a requirement reference> | |
| **Priority** | | Choose an item. | | **Source Req.** | <Put any parent requirement trace link here> | |
| **Status** | | Choose an item. | | **Owner** |  | |
| **Change Log** | | | | | | |
| **Version** | **Date** | **Author** | **Change** | | | |
| 1 |  |  | Initial version | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

###### FUR-REQ-328569/A-###R\_F\_DiffGen\_00016### Handle File with No Change

When the Diff generator detects the same file in both package with no changes and the “allowDiff” flag is set to true, the reference to that file shall be excluded from the Diff Package. Keep in mind this is different behavior from the OVTP Diff Generator.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00016###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328570/A-###R\_F\_DiffGen\_00017### Check for Diff Solution

The Diff generator shall take items from each package target and source and calculate the differential update based on items that have the same “name” and “destination” in the source and destination.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00017###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328571/A-###R\_F\_DiffGen\_00018### Diff File is too Large

In the event that the resulting Diff of a File between the source and destination package is larger than the destination file the entire file in its original form is added to the Diff Package.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00018###** | | | | | | |
| **Rationale** | | | | | | |
| <Put any rationale here> | | | | | | |
| **Acceptance Criteria** | | | | | | **V&V Method** |
| <Put any acceptance criteria here> | | | | | | <TestCase trace link> |
| **Notes** | | | | | | |
| <Put any notes here> | | | | | | |
| **Type** | | Choose an item. | | **Source** | <Put any source here, which is not a requirement reference> | |
| **Priority** | | Choose an item. | | **Source Req.** | <Put any parent requirement trace link here> | |
| **Status** | | Choose an item. | | **Owner** |  | |
| **Change Log** | | | | | | |
| **Version** | **Date** | **Author** | **Change** | | | |
| 1 |  |  | Initial version | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

###### FUR-REQ-328572/A-###R\_F\_DiffGen\_00036### Allow Diff Flag set to False

All files in the manifest with the “allowDiff” Flag set to “False” in the Destination Package shall be copied into the resulting Diff Package as is, and retaining the same “name”, “version”, “format”, and “sha256Hash”.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00036###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328573/A-###R\_F\_DiffGen\_00037### Allow Diff Flag True or not Present

When the Diff generator encounters a file in the “Files[]” in the destination software package that doesn’t have the “allowDiff” Flag or if the “allowDiff” Flag is set to True, the Diff Generator shall process the file in the way described in 4.2.4.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00037###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328574/A-###R\_F\_DiffGen\_00058### VBF Data Block Start Addresses and Lengths

Block Start addresses shall be carried over from the destination software package VBF for IVI modules.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00058###** | | | | | | |
| **Rationale** | | | | | | |
| <Put any rationale here> | | | | | | |
| **Acceptance Criteria** | | | | | | **V&V Method** |
| <Put any acceptance criteria here> | | | | | | <TestCase trace link> |
| **Notes** | | | | | | |
| <Put any notes here> | | | | | | |
| **Type** | | Choose an item. | | **Source** | <Put any source here, which is not a requirement reference> | |
| **Priority** | | Choose an item. | | **Source Req.** | <Put any parent requirement trace link here> | |
| **Status** | | Choose an item. | | **Owner** |  | |
| **Change Log** | | | | | | |
| **Version** | **Date** | **Author** | **Change** | | | |
| 1 |  |  | Initial version | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

##### Error Handling

#### Refer to R\_F\_DiffGen\_00027 for error handling.

#### Non-Functional Requirements

##### FUR-REQ-328594/A-###R\_F\_DiffGen\_00046### Bench Marking Requirements

The diff generator shall not produce a patch that is 3 percentage points larger than what is produced by the lessor of xdelta [009], bsdiff [010], or bsdiff-chunk. A percentage point is equal to one hundredth of the destination software package. So if bsdiff creates a patch that is 1 percent of the size of the destination software, then the diff generator shall not create a patch greater than 4 percent of the destination software size. When the file in question is a larger file bsdiff-chunk may be used. Bsdiff-chunk is the result of dividing the source and destination into smaller parts, patches are created for every destination part, and the size of these chunks added together are used as the size of the diff for bench mark testing. Alternatively, the chunks may individually be evaluating and compared. This method maybe used at the discretion of the Ford team in order to deliver timely performance testing results. Ford team may also create patches based on any of the source chunks, so long as there is an entry for each destination chunk, and the destination can be rebuilt from the sample output by adding the chunks together.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00046###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

##### FUR-REQ-328595/A-###R\_F\_DiffGen\_00047### Performance Testing

Ford shall run performance testing on any file or portion of a file, and acceptable performance is defined by “DiffGen\_00046”.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00047###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

##### FUR-REQ-328585/A-###R\_F\_DiffGen\_00050### Lossless compression

All patches created by the Diff generator and applied to the source used to create it shall result in an output with the same checksum as the destination input to the differential generator. This requirement applies to whole binaries and individual diffs inside of a differential update package.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00050###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

##### FUR-REQ-328586/A-###R\_F\_DiffGen\_00051### Validation

The differential generator shall validate a patch by applying it to the source diff binaries resulting in the destination binaries, and comparing it to the checksum of the actual destination binaries.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00051###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

## OVTP Diff Generator

### Function Description

The OVTP Diff Generator is used to create differential updates for modules that do not have File Systems.

### Function Interfaces

#### Logical Inputs

#### See Diff Generator 4.1.2

#### Logical Outputs

See Diff Generator 4.1.2

### Function Modeling



Figure 4: OVTP Diff Generator Flow Chart

### Function Requirements

#### Functional Requirements

##### Normal Operation

###### FUR-REQ-328576/A-###R\_F\_DiffGen\_00011### Basic Operation

When a differential package generator is creating a differential package based on two OVTP VBF software packages it shall check for the best solution for each destination block. Each destination block shall have a single diff block in the diff package. Each diff block is a solution. There are a total of 4 possible solutions Copy, Move, Diff, and Write. The Diff Package generation shall test most optimum solutions in the following order Copy, Move, Diff, and Write. When a solution is found the there is no need to test any other solutions. For example if Copy results in a valid solution then there is no need to test Move. Please see the following requirements for additional details[R\_F\_DiffGen\_00012, R\_F\_DiffGen\_00013, R\_F\_DiffGen\_00014, R\_F\_DiffGen\_00015].

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00011###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328577/A-###R\_F\_DiffGen\_00012### Testing For a Copy Solution

The Diff generator shall determine if a Copy block when the following items match between a source and destination:

1. Start Address
2. Length
3. Checksum

If all three of these fields match, then the diff generator shall create a Copy block type, with the destination address, length, and checksum.



Figure 5

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00012###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328578/A-###R\_F\_DiffGen\_00013### Testing for a Move Solution

The Diff generator shall determine if a Move block is needed when a Copy is not possible. The following items match between a source and destination:

1. Length
2. Checksum

If these fields match, then the diff generator shall create a Move block type, with the destination address, length, and checksum.



Figure 6

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00013###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328579/A-###R\_F\_DiffGen\_00014### Testing for a Diff Solution

If the Diff Generator is not able to find a solution using copy or move, then it will check if the Diff provides a valid solution. The Diff generator will take the current Destination block, and will create a Diff between the current destination block and each source block. The pair that results with the smallest solution shall be used to generate a Diff block. If the size of the output is equal or greater than the destination block then it shall not be used as a solution.



Figure 7

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00014###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328580/A-###R\_F\_DiffGen\_00015### Testing for a Write solution

If the Destination Block doesn’t have a Copy, Move, or Diff solution, the diff generator shall create a write block for the destination Block.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00015###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328581/A-###R\_F\_DiffGen\_00057### Diff Package VBF data block Length

The VBF Data Block length shall be populated by the diff generator based on the total length of the resulting diff package data block output from the diff generator. This only applies to OVTP Diff packages.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00057###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

###### FUR-REQ-328582/A-###R\_F\_DiffGen\_00056### Diff Package on Module Physical Address

The Diff Generator shall populate the VBF Data block start address [LSG0006] based on “Diff Package on Module Physical Address” in “API Diff Request”.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00056###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

##### Error Handling

#### Non-Functional Requirements

## Patch Test Tool

### Function Description

The purpose of the patch test tool is to validate Differential Update package against a source Package, and reproduce a destination package.

### Function Interfaces

#### Logical Inputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | Source Package | The older software that needs to be updated. |
|  | Diff Package | The package created by the Diff Generator. |
|  | Type | Specifies the type of diff package, this may be set to “OVTP ECU”, “SOC”, or “BINARY”. |

#### Logical Outputs

|  |  |  |
| --- | --- | --- |
| **Signal ID** | **Signal Name** | **Description** |
|  | Destination Package | The recreated destination package, which can be validated by the Tester for integrity. |

### Function Requirements

#### Functional Requirements

##### Normal Operation

###### FUR-REQ-328583/A-###R\_F\_DiffGen\_00052### General Operation

The Patch Test Tool shall take a Source Package a Diff Package, a type, and output the result to a specified filename. Below is an example help output of the command line utility.

**Usage:**

WINDDIFFPATCHER [Source Package] [Destination Package output Filename] [diff package]

**Examples:**

WINDDIFFPATCHER mybin-1.exe mybin-2\_example.exe mybin-1\_mybin-2.diff –BINARY

**Options:**

-h –help Show this help text.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00052###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

##### Error Handling

###### FUR-REQ-328584/A-###R\_F\_DiffGen\_00054### Invalid Format

The utility shall return an invalid format error, and specify the name of the file that caused the error. The error may be attributed to the VBF header, or the diff package itself. It shall use all of the same error codes as defined in “DiffGen\_00027”.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00054###** | | | | | | | | | | | | | | | | |
| **Rationale** | | | | | | | | | | | | | | | | |
| <Put any rationale here> | | | | | | | | | | | | | | | | |
| **Acceptance Criteria** | | | | | | | | | | | | | | **V&V Method** | | |
| <Put any acceptance criteria here> | | | | | | | | | | | | | | <TestCase trace link> | | |
| **Notes** | | | | | | | | | | | | | | | | |
| <Put any notes here> | | | | | | | | | | | | | | | | |
| **Type** | | | | Choose an item. | | | | | **Source** | | <Put any source here, which is not a requirement reference> | | | | | |
| **Priority** | | | | Choose an item. | | | | | **Source Req.** | | <Put any parent requirement trace link here> | | | | | |
| **Status** | | | | Choose an item. | | | | | **Owner** | |  | | | | | |
| **Change Log** | | | | | | | | | | | | | | | | |
| **Version** | | **Date** | | **Author** | | **Change** | | | | | | | | | | |
| 1 | |  | |  | | Initial version | | | | | | | | | | |
| **Legacy Requirement** | | | |  | | | | | | | | | | |
| **Rationale** | | | |  | | | | | | | | | | |
| **Acceptance Criteria** | | | |  | | | | | | | | | | |
| **Notes** | | | |  | | | | | | | | | | |
| **Source** | | | |  | | | | | | | **Owner** |  | | |
| **Source Req.** | | | |  | | | | | | | **V&V Method** |  | | |
| **Type** | | | |  | | | **Priority** | |  | | **Status** |  | | |
|  | |  | | | | End of Requirement | | | | | | | |

#### Non-Functional Requirements

##### FUR-REQ-328596/A-###R\_F\_DiffGen\_00055### Response Time

The total time to apply a patch shall not exceed:

(X(MB) + Y(MB) ) x 1 second = MaxAllowedPatchTime

Where X is the source file size in mega Bytes, and Y is the destination file size in mega Bytes, and MaxAllowedPatchTime is in seconds running on a windows 7 machine with an Intel Core i5 CPU running at 2.6 GHz.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Requirement ID: ###R\_F\_DiffGen\_00055###** | | | | | | |
| **Rationale** | | | | | | |
| <Put any rationale here> | | | | | | |
| **Acceptance Criteria** | | | | | | **V&V Method** |
| <Put any acceptance criteria here> | | | | | | <TestCase trace link> |
| **Notes** | | | | | | |
| <Put any notes here> | | | | | | |
| **Type** | | Choose an item. | | **Source** | <Put any source here, which is not a requirement reference> | |
| **Priority** | | Choose an item. | | **Source Req.** | <Put any parent requirement trace link here> | |
| **Status** | | Choose an item. | | **Owner** |  | |
| **Change Log** | | | | | | |
| **Version** | **Date** | **Author** | **Change** | | | |
| 1 |  |  | Initial version | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

# Open Concerns

| ID | Concern Description | e-Tracker / Reference | Responsible | Status | Solution |
| --- | --- | --- | --- | --- | --- |
| 1 | How many different clients are going to connect to the diffgen? |  |  |  |  |
| 2 | See Jira #58 |  |  |  | Updated and fixed. |
| 3 | Need to put together a separate doc that covers signing of VBF files. |  |  |  |  |
| 4 | Jira #60 Update messages in 4.1.3 |  |  |  | Complete |
| 5 | Start Address for SWUA Modules Jira #59 |  |  |  | See DiffGen\_00058 |
| 6 | Need references for Xdelta and BSdiff Version. |  |  |  | Added references [009] and [010] |
| 7 | #62 and #67, Wind River will only support Binary patch command line. |  |  |  | Updated section 4.4 |
| 8 |  |  |  |  |  |
| 9 |  |  |  |  |  |

Table 8: Open Concerns

# Traceability Matrix

**No table of contents entries found.**

# Revision History

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Rev.  (revision) | Vers. | Date | Description | Approved by | Responsible |
| *001* |  |  | *Initial version* |  |  |
|  |  |  | *Removed Specific file format references for diff support.* |  |  |
|  |  |  | *Changed error Code 506 to 44 to matcb existing implementation.* |  |  |

## Template Revisions

*#Important: Do not change this section*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Version | Rev. | Date | Description | Responsible |
| *1* | *0* | *2016-02-26* | *Initial version, derived form FDS* | *Jbaden1* |
| *1* | *1* | *2016-02-26* | *Word properties corrected* | *Jbaden1* |
| *1* | *2* | *2016-03-10* | *Clean up of ocument meta data (Word properties)* | *Jbaden1* |
| *1* | *3* | *2016-03-22* | *Footer formating corrected (Issue 19)*  *“Constraints” chapter renamed to “Input Requirements” (Issue 20)* | *Jbaden1* |
| *1* | *4* | *2016-04-20* | *Broken Wiki links repaired* | *Jbaden1* |
| *2* | *0* | *2016-06-10* | *Document metadata adapted. Prepared for new macros*  *DTC table removed*  *HMI function added as a chapter (details still to be refined)*  *Signal / Parameter IDs column deleted interface tables* | *Jbaden1* |
| *2* | *1* | *2016-07-14* | *Converted to SysML diagrams*  *HMI section further elaborated*  *Template version added to footer*  *Dedicated Startup / Shutdown sections removed (only hints added)*  *Data Dictionary reworked and Signal / Parameter IDs column re-introduced* | *Jbaden1* |
| *2* | *2* | *2016-12-07* | *Minor formatting changes* | *Jbaden1* |
| *3* |  |  | *Skipped to synchronize with Specification\_Macros.dotm* |  |
| *4* |  |
| *5* | *0* | *2017-01-13* | *Meta data updated for specification macros, version 3.1*  *SW Unit chapter removed for the time being*  *Green boxes added for user hints* | *Jbaden1* |
| *5* | *1* | *2017-01-18* | *Some additional hints.*  *Hyperlinks highlighted in hints* | *Jbaden1* |

# Appendix

## Data Dictionary

### Logical Signals

#### FUR-REQ-328597/A-###LSG\_DiffGen\_00001### API Diff Request

Request for a differential package based on a given Source and Destination.

|  |  |  |
| --- | --- | --- |
| Data Type | Init Value | Allowed Values  (missing signal) |
| Type | OVTP | OVTP, IVI |
| Source Package URL |  |  |
| Destination Package URL |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

#### FUR-REQ-328598/A-###LSG\_DiffGen\_00002### API Diff Response

Response that the Diff generation is in progress. Includes a transaction ID, which will be report with the final result.

|  |  |  |
| --- | --- | --- |
| Data Type | Init Value | Allowed Values  (missing signal) |
| Response |  | Pending, Error |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

#### FUR-REQ-328599/A-###LSG\_DiffGen\_00003### Diff Result

The result of the differential update.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

#### FUR-REQ-328600/A-###LSG\_DiffGen\_00007### IVI Module VBF structure

The Diff generator receives and outputs packages in the structure described in Table 9. The data blocks consist of a manifest, a signature, and one or many files. Each data block consists of a single file. The first data block always contains the manifest. The second block always contains the signature, and the remaining blocks contain the files in the order that they are referenced in the manifest. All VBF fields are described in the VBF 3.1 specification.

When a Diff is created on an entry in the manifest, the format field is updated to RAW\_DIFF, and the allowDiff option is set to “FALSE”. All other fields including the sha256 are carried over to the IVI Software Package manifest entry.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | VBF with IVI Diff Package | | | | | | | |
|  |  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|  |  | Version Section  Text n length | | | | | | | |
|  |  | Header Section Text n Length | | | | | | | |
| VBF Data Section | Block 1 | Start Address  4 bytes, binary (0x00000001) | | | | | | | |
| Length 4 bytes, binary | | | | | | | |
| **Data**   n bytes  binary data (Manifest)  **See LSG\_DiffGen\_00005** | | | | | | | |
| Checksum  CRC16-CITT  (2 Bytes) | | | | | | | |
| Block2 | Start Address 4 bytes, binary | | | | | | | |
| Length 4 bytes, binary | | | | | | | |
| **Data**   n bytes  binary data (Manifest.sig) | | | | | | | |
| Checksum  CRC16-CITT  (2 Bytes) | | | | | | | |
| Block 3 | Start Address 4 bytes, binary | | | | | | | |
| Length 4 bytes, binary | | | | | | | |
| **Data** n bytes  binary data (File 1) | | | | | | | |
| Checksum  CRC16-CITT  (2 Bytes) | | | | | | | |
| Block 4 | Start Address 4 bytes, binary | | | | | | | |
| Length 4 bytes, binary | | | | | | | |
| **Data**   n bytes  binary data (File 2) | | | | | | | |
| Checksum  CRC16-CITT  (2 Bytes) | | | | | | | |
| Block 5 | Start Address 4 bytes, binary | | | | | | | |
| Length 4 bytes, binary | | | | | | | |
| **Data**   n bytes  binary data (File N) | | | | | | | |
| Checksum  CRC16-CITT  (2 Bytes) | | | | | | | |

IVI Module VBF Structure Table 10

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

#### FUR-REQ-328601/A-###LSG\_DiffGen\_00005### SOC IVI Software Package

The based software update manifest shall be written in the following JSON format, keep in mind the values in each of fields are descriptions of the schema and not literal values:

{

    "fileCount" : 1-n,

    "ecuId" : "string",

    "partNumber": "string",

    "signatureAlg" : "X509CMS",

    "Files" : [

        {

            "name" : "filename",

            "version" : "1.0.1",

            "destination" : "SYSTEM|IFS|CONFIG|APP|CBOOT|ABOOT|VMCU|TOKEN|MODEM",

            "format" : "RAW|SPARSE|RAW\_DIFF|GZIP|TEXT",

            "sha256Hash" : "hash",

            "allowDiff" : "TRUE|FALSE"

        }

    ]

}

Figure 9 File Based Software Package Manifest Format [004]

**fileCount** – Number of files present in the Manifest, excluding the manifest itself and the manifest.sig.

**ecuId** – String, this is carried over from the destination package into the Diff Package.

**partNumber**- String carried over from the destination package over into the Diff Package.

**signitureAlg** – this is carried over from the destination package into the Diff Package.

**Files** – is and ordered list of Files in the software package.

**name** – Name of the file.

**Version** – String which is carried over from the destination package to the Diff package for the referenced file.

**Destination** – This is the logical location of where the file shall be stored on the module.

**Format** – this specifies the file type, this is replaced with “Diff” when diff is successfully created, other wise it remains the same when added to the Diff Package.

**Sha256Hash** – This is a Sha256 calculation of the file name in the name field, that is in package of interest. This must be recalculated for the diff package if the file is diffed.

**allowDiff** – Optional field that specifies if the file is to be diffed, if set to False it is copied into the destination package as is, if it is set to True or not present, it may be copied or diffed.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

#### FUR-REQ-328602/A-###LSG\_DiffGen\_00006### VBF wrapped OVTP Diff Package

An OVTP or ECU Diff Package is outputted by the diff generator in VBF format. This is a VBF file consisting of a single data block containing the diff package. The first diagram table 11 shows a VBF wrapped diff package. All fields in table 9 are described in detail in the VBF 3.1 specification. Table 10 describes the layout of the OVTP Diff package contained in the data block. Table 11 describes the lay out of the diff block.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | VBF with Diff Package | | | | | | | |
|  |  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|  |  | Version Section  Text n length | | | | | | | |
|  |  | Header Section Text n Length | | | | | | | |
| VBF Data Section | Block1 | Start Address 4 bytes, binary | | | | | | | |
| Length 4 bytes, binary | | | | | | | |
| **Data**   n bytes  binary data (Diff Package) | | | | | | | |
| Checksum  CRC16-CITT  (2 Bytes) | | | | | | | |

VBF wrapped OVTP Diff Package Table 12

|  |
| --- |
| Diff Package |
| BlockCount (1 Byte) |
| Diff Block 1 (n Bytes) |
| Diff Block 2 (n Bytes) |
| … |
| Diff Block N (n Bytes) |

Diff Package Table 13

|  |
| --- |
| Diff Block |
| BlockType (1 Byte)  0 - Diff  1 - Copy 2 - Write 3 - Move |
| Logical Source Address (4 Bytes) |
| Logical Target Address (4 Bytes) |
| Logical Target Length **n** (4 Bytes) |
| DiffData Size (4 Bytes) |
| Diff Data (**n Bytes)** |
| Checksum CRC16-CITT (2 Bytes) |

Diff Block Table 14

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

#### FUR-REQ-328603/A-###LSG\_DiffGen\_00008### Manifest Sig

The Manifest Sig data block will remain empty as a place holder to be populated by Ford.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Legacy Requirement** | |  | | | | | | |
| **Rationale** | |  | | | | | | |
| **Acceptance Criteria** | |  | | | | | | |
| **Notes** | |  | | | | | | |
| **Source** | |  | | | | **Owner** |  | |
| **Source Req.** | |  | | | | **V&V Method** |  | |
| **Type** | |  | | **Priority** |  | **Status** |  | |
|  |  | | End of Requirement | | | | |

### Data Types

### Attachments



