SMPTE EG 2021-3:2009
Content previously included in SMPTE 2021M-2008

SMPTE ENGINEERING GUIDELINE

Broadcast Exchange Format (BXF) — Use Cases

Approved
December 4, 2009

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Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Recommended Practices and Engineering Guidelines, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

SMPTE Engineering Documents are drafted in accordance with the rules given in Part XIII of its Administrative practices. SMPTE Standard 2021-3 was prepared by Technology Committee 32NF.

Intellectual Property

At the time of publication no notice had been received by SMPTE claiming patent rights essential to the implementation of this Standard. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

Introduction

This section is entirely informative and does not form an integral part of this Engineering Document

Broadcast Exchange Format (BXF) is a protocol for exchange of data among broadcast systems such as Traffic, Program Management, Automation, and Content Distribution. It is intended to facilitate the movement of content and its associated metadata for better management, coordination and reporting between these broadcast systems. The BXF Protocol serves as a replacement for the many proprietary interfaces in place today between vendors in these areas.

Unless otherwise specified the order of precedence of the types of normative information in this document shall be as follows. Normative prose shall be the authoritative definition. Tables shall be next, followed by formal languages, then figures, and then any other language forms. In the event of a conflict between the schema and other information in this document, the schema is authoritative.

SMPTE 2021 (BXF) is now broken into several parts. A brief outline of the parts can be found in SMPTE 2021-0, the Document Roadmap to this suite of documents.

1. Scope

Generally the Broadcast eXchange Format (BXF) defines the format and content of XML Messages for the interchange of data and metadata among professional systems, as follows:

1. Broadcast schedules, including playout and record schedules
2. As run information
3. Content metadata, such as Content ID, Title, Duration, etc.
4. Content management requests such as dub and purge requests
5. Requests for transfer of content some of which will result in the transfer of Content essence between professional systems.
6. Ports as used by TCP/IP for the exchange of messages

The primary systems envisioned as users of this standard are:

Program Management Systems
Broadcast Traffic Systems
Master Control Automation Systems
Content Distribution Systems

This particular document focuses on use cases of BXF, helping implementers to better understand how BXF may be used in a variety of scenarios.

2. Conformance Notation

Documents consist of normative text and, optionally, informative text. Normative text is that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in a Standard, Recommended Practice, Amendment, Addendum, or Corrigendum, is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

Normative references are external documents referenced in normative text that are indispensable to the user. Bibliographic references are references made in informative text or are those otherwise not indispensable to the user. Normative references shall conform to the types and procedures specified in the Engineering Administrative Practices.

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted. The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword “reserved” indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword “forbidden” indicates “reserved” and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to an Engineering Document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

3. Document Elements

The SMPTE 2021 suite is comprised of the following elements, which form an integral piece of this Standard. Additionally, the schema files may be found at http://smpte-ra.org/schemas/2021/2008/BXF. (Accessible only by appropriately-designed software applications, for schema validation. Not intended to be human-accessible.)

a) Prose document S2021-3-2009.pdf (this file) [Normative]

b) XML schema s2021-2009.xml [Normative]

c) HTML schema guide s2021-2009.html [Informative]

4. Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

SMPTE ST 2021-1, Broadcast Exchange Format (BXF) — General Information and Informative Notes, December 4, 2009

5. Use Cases (Informative)

5.1 Metadata update

Context of Use: The program management system is a repository for program scheduling information for the broadcast facility. Changes to the schedule by programming and its related metadata must be disseminated to the other stakeholders. Likewise, the traffic system maintains a list of formats that each program and/or time period uses to represent potential sales inventory. The combination of format and program schedule metadata is required to create a detailed event playlist for automation. To synchronize traffic and programming several transactions are required. This includes the process of initializing, adding, and deleting formats, programs and program schedules as well as scheduling specific title/episode information for a program.

The example below represents only one of several possible transactions. This is the updating of a traffic format structure initiated by the traffic system and sent to the programming system.

Origination System: Traffic

Destination System: Program Management

Trigger: Traffic changed the format in its system and is updating programming with the change.

Additional Stakeholders and Interests:

Traffic System – Creates format structures and needs to disseminate this data to programming when changes are made.

Program Management System – To properly time the actual length of a program, the format details are required. This tells the program department how much time must be reserved for non-programming content. Programming may need to adjust the length of the program content in order to keep the total length of the scheduled program within designated parameters.

Automation User – Accurate program timings are moved further up the scheduling decision path and improve the likelihood that the program's actual aired length matches to the planned scheduled length reducing last minute changes by the engineering staff.

QC staff – Reduces the number of last minute program changes that require additional approval by QC staff. If programming has accurate timings during the scheduling process they can avoid program modifications that might affect a program's QC status.

Preconditions: A session has been established.

Main Success Scenario:

Format Change or Update:

1. Traffic changes a format in their system and sends Programming the change that is the complete format structure including the changes made.

2. Programming accepts the format change and updates its records and replies back to track with a reply indicating that the update was successful.

Failure or other issues:

3. The format may already be in use on the schedule and changes to the format do not automatically get applied to all future dates. It is up to the scheduling or traffic system to cast the format change onto the schedule and send the schedule changes that this generates. If programming does not recognize the format in its system, then it can respond that the format was not updated or it can assume it needs to add the format as a new record. This would result in a different reply to the traffic system.

4. Use Case ends.

Example: Traffic changes an existing Format and sends the Program Management System the changes.

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<BxfMessage id="urn:uuid:ABCCDDDD-6000-11D3-8CFE-0050048383C9" dateTime="2006-08-16T20:44:43.16"
messageType="Information" origin="Traffic System" originType="Traffic" destination="Program Management" userName="Traffic
System User" xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd">
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                </SmpteDuration>
            </FormatLength>
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</BxfMessage>
```

5.2 Schedule

Context of Use: After the preparation of the daily log, events (which typically include programming, commercials, promos/PSAs and other interstitial material) are sent to the automation system. Further processing is needed in many cases to prepare these events for airing through the automation system. This processing prepares the events to be automation-ready which can be executed for playout. A single or a group of events can be sent at one time. This use cases exemplifies the process to accept new or updated events.

Origination System: Traffic

Destination System: Automation

Trigger: Events submitted from the traffic system.

Additional Stakeholders and Interests:

Traffic System: Creates the completed schedule and submits it to the automation system for execution.

Automation System: Accepts and validates the schedule received from traffic, and executes said schedule at the appropriate time.

Preconditions: Events are available for playout.

Main Success Scenario:

Traffic System:

1. Traffic user selects a single or series of traffic events to be sent to the automation system.
2. Traffic user submits traffic events to the automation system.

Automation System:

3. Traffic events are accepted in automation system.
4. Traffic events are converted to automation events.
5. Automation database populates fields needed to execute playout (playout information includes timing, media, device, format, etc.)
6. Automation submits updated events (schedule and timing) information to the traffic database.
7. Use Case ends.

Example: A Playlist schedule for the Evening News on Network Affiliate WXXX with two local breaks.

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391F2" dateTime="2006-09-05T13:38:26.28"
messageType="Information" origin="Traffic System" originType="Traffic" userName="Traffic System User" destination="Automation"
xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd"
xmlns:pmcp="http://www.atsc.org/XMLSchemas/pmcp/2007/3.1"
pmcp:schemaLocation="http://www.atsc.org/XMLSchemas/pmcp/2007/3.1/pmcp31.xsd">
      <BxfData action="add">
            <Schedule type="Primary" scheduleId="urn:uuid:00000000-0000-0000-0000-0038338391E0" scheduleName="WXXX Ch 6-
1" scheduleStart="2006-06-21T17:30:00.00" scheduleEnd="2006-06-21T17:30:00.00">
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```

5.3 Dub order

Context of Use: Content is inventoried in traffic systems as the control point for the appropriate use of the material. Because the traffic system is the repository for the disposition of the information the dub process helps to administer the external content inventory. The dub process communicates the need for the content to be dubbed onto a medium (i.e. server, cart, etc.) for convenient playback.

Origination System: Traffic

Destination System: Automation

Trigger: Traffic user receives new content or there is a need to convert from tape-storage to server-storage.

Additional Stakeholders and Interests:

Automation User: Executes the ingesting of material, linking the metadata received in the dub-order from traffic to the essence either already stored or due to be ingested.

Traffic User: Sends the dub order to automation, thereby sharing metadata related to the essence in question with the automation system.

Preconditions: There is a need to create an order to dub, or purge content within the facility.

Main Success Scenario:

Traffic department:

1. Traffic user request content items to be placed on a dub order.
2. Traffic user submits dub order to automation system.

Automation system:

3. Automation user acknowledges new order for dub of content.
4. Automation system submits status for dub order to the traffic system.

Traffic system:

5. Traffic system accepts status and updates its database with the information from the automation system.
6. Use Case ends.

Example: Message and metadata to dub content essence

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0048338391E1" messageType="Information" dateTime="2006-08-25T13:19:41.28" origin="Traffic System" originType="Traffic" destination="Automation" userName="Traffic System User" xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd">
    <BxfData action="add">
        <ContentTransfer transferId="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1" transferType="Duplication" priority="Normal">
            <Content>
                <NonProgramContent>
                    <Details>
                        <SpotType>Promo</SpotType>
                    </Details>
                    <ContentMetaData>
                        <ContentId>
                            <HouseNumber>ITVS_HYP</HouseNumber>
                        </ContentId>
                        <Name>ITVS HYPERBOLE</Name>
                        <Description/>
                    </ContentMetaData>
                </NonProgramContent>
            </Content>
            <Source>
                <Media>
                    <BaseBand>
                        <Audio>
                            <DigitalAudio>
                                <Ac3Audio audioId="1"/>
                            </DigitalAudio>
                        </Audio>
                        <Video>
                            <Encoding>MPEG-2</Encoding>
                            <DigitalVideo>true</DigitalVideo>
                            <Format>720p</Format>
                            <AspectRatio>4:3</AspectRatio>
                        </Video>
                    </BaseBand>
                    <MediaLocation>
                        <Location>
                            <PhysicalAsset assetName="Tape">
                                <MediaReferenceName>31-109</MediaReferenceName>
                            </PhysicalAsset>
                        </Location>
                        <SOM>
                            <SmpteTimeCode>00:00:00:00</SmpteTimeCode>
                        </SOM>
                        <Duration>
                            <SmpteDuration>
                                <SmpteTimeCode>00:00:30:00</SmpteTimeCode>
                            </SmpteDuration>
                        </Duration>
                    </MediaLocation>
                </Media>
            </Source>
            <Destination>
                <Media>
                    <BaseBand/>
                    <MediaLocation>
                        <Location>
                            <AssetServer playoutAllowed="true" fileTransferAllowed="true">
                                <PathName>C:\media\commercials</PathName>
                                <ReferenceName>AssetServerA</ReferenceName>
```

```
                    </AssetServer>
                </Location>
                <SOM>
                    <SmpteTimeCode>00:00:00:00</SmpteTimeCode>
                </SOM>
                <Duration>
                    <SmpteDuration>
                        <SmpteTimeCode>00:00:30:00</SmpteTimeCode>
                    </SmpteDuration>
                </Duration>
                <ArchiveGroup>
                    <ArchiveName>Interstitial</ArchiveName>
                </ArchiveGroup>
            </MediaLocation>
        </Media>
        <UsagePolicy>
            <PurgeDate>9999-12-31T00:00:00.00</PurgeDate>
        </UsagePolicy>
    </Destination>
</ContentTransfer>
</BxfData>
</BxfMessage>
```

5.4 Purge order

Context of Use: Content is inventoried in traffic systems as the control point for the appropriate use of the material. Because the traffic system is the repository for the disposition of the information the purge process (along with the dub order) also administrates the external content inventory. At the conclusion of the allowable run of the content a purge of the material from the playback medium is normally requested.

Origination System: Traffic

Destination System: Automation

Trigger: Dated content needs to be removed.

Additional Stakeholders and Interests:

Automation User: Accepts the purge order from traffic and removes the associated content from its inventory.

Traffic User: Sends an order to remove content from inventory.

Preconditions: There is a need to purge content within the facility.

Main Success Scenario:

Traffic system:

1. Traffic user requests content items to be placed on purge order.
2. Traffic user submits purge order to automation system.

Automation system:

3. Automation user acknowledges purge order to automation system.
4. Automation system submits status for purge order to the traffic system.

Traffic system:

5. Traffic system accepts status and updates its database with the information from the automation system.
6. Use Case ends.

Example: Purge Media by adding a new purge order for Media #311

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:ABCCDDDD-2222-22E3-9AFF-0038338391E1" messageType="Information" dateTime="2006-08-16T20:44:43.16" origin="Traffic System" originType="Traffic" destination="Automation" userName="Traffic System User" xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd">
    <BxfData action="add">
        <ContentTransfer transferId="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1" transferType="Purge" priority="Normal">
            <Content user="Traffic User">
                <ProgramContent>
                    <ContentMetaData>
                        <ContentId>
                            <HouseNumber>311</HouseNumber>
                        </ContentId>
                        <Name>A2: SIGN ON</Name>
                    </ContentMetaData>
                </ProgramContent>
            </Content>
        </ContentTransfer>
    </BxfData>
</BxfMessage>
```

5.5 Record order

Context of Use: Content is inventoried in traffic systems as the control point for the appropriate use of the material. Because the traffic system is the repository for the disposition of the information, the live-recording process (along with the dub and purge order) also administrates the external content inventory. At a particular time of day, a recording of a show can be requested.

Origination System: Traffic

Destination System: Automation

Trigger: Traffic user is alerted to the opportunity of a satellite/studio-fed show that needs to be captured and stored on local media.

Additional Stakeholders and Interests:

Automation User: Accepts an order to obtain content from a particular source fed at a particular time.

Traffic User: Uses the live feed schedule to plan for the recording of content by the automation system, and shares this information with said system for the storage of live material. This content can then be used at a later time.

Preconditions: There is a need to record a live show within the facility.

Main Success Scenario:

Traffic department:

1. Traffic user request content items to be placed on a record order.
2. Traffic user submits record order to automation system.

Automation system:

3. Automation user acknowledges new order for recording of content.
4. Automation system submits status for record order to the traffic system.

Traffic system:

5. Traffic system accepts status and updates its database with the information from the automation system.
6. Use Case ends.

Example: Message and metadata to schedule recording of content

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:ABCCDDDD-2223-22E3-9AFF-0038338391E1" messageType="Information" dateTime="2006-08-25T13:08:59.91" origin="Traffic System" originType="Traffic" destination="Automation" userName="Traffic System User" xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd">
    <BxfData action="add">
        <ContentTransfer transferId="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1" transferType="Recording" priority="Normal" recordEventStart="2006-10-01T03:00:00.00" recordEventEnd="2006-10-01T03:29:30.00">
            <Content>
                <ProgramContent>
                    <ContentMetaData>
                        <ContentId>
                            <HouseNumber>PBC5-1</HouseNumber>
                        </ContentId>
                    </ContentMetaData>
                </ProgramContent>
            </Content>
            <Source>
                <Media>
                    <BaseBand>
                        <Audio>
                            <DigitalAudio>
                                <Ac3Audio audioId="1"/>
                            </DigitalAudio>
                        </Audio>
                        <Video>
                            <Encoding>MPEG-2</Encoding>
                            <DigitalVideo>true</DigitalVideo>
                            <Format>720p</Format>
                            <AspectRatio>4:3</AspectRatio>
                        </Video>
                    </BaseBand>
                    <MediaLocation>
                        <Location>
                            <Satellite>
                                <SatelliteName>XYZ1</SatelliteName>
                                <Transponder>
                                    <Polarity>Horizontal</Polarity>
```

```
                                        <TransponderNumber>501</TransponderNumber>
                                    </Transponder>
                                    <Receiver>RCVR2</Receiver>
                                    <Encoder>ENC1</Encoder>
                                </Satellite>
                            </Location>
                            <SOM>
                                <SmpteTimeCode>00:00:00:00</SmpteTimeCode>
                            </SOM>
                            <Duration>
                                <SmpteDuration>
                                    <SmpteTimeCode>00:29:30:00</SmpteTimeCode>
                                </SmpteDuration>
                            </Duration>
                        </MediaLocation>
                    </Media>
                </Source>
                <Destination>
                    <Media>
                        <BaseBand/>
                        <MediaLocation>
                            <Location>
                                <PhysicalAsset assetName="Tape">
                                    <MediaReferenceName>PBC5-1</MediaReferenceName>
                                </PhysicalAsset>
                            </Location>
                            <SOM>
                                <SmpteTimeCode>00:00:00:00</SmpteTimeCode>
                            </SOM>
                            <Duration>
                                <SmpteDuration>
                                    <SmpteTimeCode>00:29:30:00</SmpteTimeCode>
                                </SmpteDuration>
                            </Duration>
                            <ArchiveGroup>
                                <ArchiveName>Archive A</ArchiveName>
                            </ArchiveGroup>
                        </MediaLocation>
                    </Media>
                </Destination>
            </ContentTransfer>
            <ContentTransfer transferId="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E2" transferType="Recording"
priority="Normal" recordEventStart="2006-10-01T06:00:00.00" recordEventEnd="2006-10-01T06:28:46.00">
                <Content>
                    <ProgramContent>
                        <ContentMetaData>
                            <ContentId>
                                <HouseNumber>6BC-102</HouseNumber>
                            </ContentId>
                            <Name>A Half Hour Program</Name>
                        </ContentMetaData>
                    </ProgramContent>
                </Content>
                <Source>
                    <Media>
                        <BaseBand>
                            <Audio>
                                <DigitalAudio>
                                    <Ac3Audio audioId="1"/>
                                </DigitalAudio>
                            </Audio>
                            <Video>
                                <Encoding EncodingReference="Digital Betacam">MPEG-2</Encoding>
                                <Format>480i</Format>
```

```
                        <AspectRatio>4:3</AspectRatio>
                    </Video>
                    <Captions>
                        <Caption608/>
                    </Captions>
                </BaseBand>
                <MediaLocation>
                    <Location>
                        <Satellite>
                            <SatelliteName>XYZ1</SatelliteName>
                            <Transponder>
                                <Polarity>Horizontal</Polarity>
                                <TransponderNumber>500 </TransponderNumber>
                            </Transponder>
                            <Receiver>RCVR1</Receiver>
                            <Encoder>ENC2</Encoder>
                        </Satellite>
                    </Location>
                    <SOM>
                        <SmpteTimeCode>00:00:00:00</SmpteTimeCode>
                    </SOM>
                    <Duration>
                        <SmpteDuration>
                            <SmpteTimeCode>00:28:46:00</SmpteTimeCode>
                        </SmpteDuration>
                    </Duration>
                </MediaLocation>
            </Media>
        </Source>
        <Destination>
            <Media>
                <PrecompressedTS/>
                <MediaLocation>
                    <Location>
                        <AssetServer playoutAllowed="true" fileTransferAllowed="true">
                            <PathName>C:\MediaFiles\Programs</PathName>
                        </AssetServer>
                    </Location>
                    <SOM>
                        <SmpteTimeCode>00:00:00:00</SmpteTimeCode>
                    </SOM>
                    <Duration>
                        <SmpteDuration>
                            <SmpteTimeCode>00:28:46:00</SmpteTimeCode>
                        </SmpteDuration>
                    </Duration>
                    <ArchiveGroup>
                        <ArchiveName>Archive B</ArchiveName>
                    </ArchiveGroup>
                </MediaLocation>
            </Media>
        </Destination>
    </ContentTransfer>
</BxfData>
</BxfMessage>
```

5.6 Transfer order

Context of Use: Content distribution continues to become an important method of receiving content representing an auxiliary repository of needed content for a broadcast facility. These use cases represent the processes of notification of new or updated content, retrieving content, format sheets and transfers from the content distribution system. Other user goals defined allow the user to manipulate a requested transfer by reprioritization or cancellation of the request.

Origination System: Traffic/Automation/Program Management

Destination System: Content Distribution

Trigger: A request has been made to retrieve, or transfer content.

Additional Stakeholders and Interests:

Content – includes video/audio content as well as metadata for the content to be transferred from one location to another.

Preconditions: A session has been established.

Main Success Scenario:

Submit Content Notification:

1. CPS sends a *notify-content* message to ES when content is added, updated or removed.
2. ES sends an *ack* message.
3. Use case ends.

Retrieve Content:

1. ES sends a *query-content* message.
2. CPS validates the message and sends back an *ack* message.
3. If the message is invalid, CPS sends a negative *ack* message and terminates the use case.
4. CPS retrieves content.
5. CPS sends a *list-content* message.
6. ES sends an *ack* message.
7. Use case ends.

Retrieve Format Sheet:

1. ES sends a *query-format-sheet* message.
2. CPS validates the message and sends back an *ack* message.
3. If the message is invalid, CPS sends a negative *ack* message and terminates the use case.
4. CPS retrieves the format sheet and sends a *list-format-sheet* message.
5. ES sends an *ack* message.
6. Use case ends.

Retrieve Transfers:

1. ES selects transfer id or destination name.
2. ES sends a query-*transfer* message.
3. If the message is invalid, CPS sends a negative *ack* message and terminates the use case.
4. CPS validates the message and sends an *ack* message.
5. CPS retrieves information about transfers.
6. CPS sends a list-transfer message
7. ES sends an *ack* message.
8. Use case ends.

Transfer Content:

1. ES selects content and destination.
2. ES sends a *transfer-content* message.
3. If the message is invalid, CPS sends a negative *ack* and terminates the use case.
4. CPS validates the message and sends an *ack* message.
5. CPS transfers the requested content to the requested destination.
6. CPS sends a *notify-transfer* when the content is transferred.
7. ES sends an *ack* message.
8. Use case ends.

Change Transfer Priority:

1. ES selects a 'queued' transfer and a priority
2. ES send a set-*transfer-priority* message.
3. If the message is invalid, CPS sends a negative *ack* message and terminates the use case.
4. CPS validates the message and sends an *ack* message.
5. CPS changes the priority of transfer.
6. Use case ends.

Cancel Transfer:

1. ES selects a transfer to cancel
2. ES send a *cancel-transfer* message.
3. If the message is invalid, CPS sends a negative *ack* and terminates the use case.
4. CPS validates the message and sends an *ack* message.
5. CPS cancels the transfer if the transfer is not already finished.
6. Use case ends

Example: Message and metadata to initiate or schedule (file) transfer of content

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:F1234568-0022-92EE-9BA6-C293A1FA6693" messageType="Information" dateTime="2006-09-
06T07:50:23.26" origin="Traffic System" originType="Traffic" destination="Automation" userName="Traffic System User"
xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd">
<BxfData action="add">
<ContentTransfer transferId="urn:uuid:FF56FE68-3D41-11DB-8AF6-B622A1EF5492" transferType="File transfer" priority="Normal">
      <Content location="http://edgeserver.com/incoming_files" source="Regional Distributor">
                  <ProgramContent>
                        <ContentMetaData>
                              <ContentId action="add">
                                    <Isan root="0000-0001-6134" episodeOrPart="008B" check1="C" version="0000-0000" check2="1"/>
                              </ContentId>
                              <Name>Hello World</Name>
                              <Description>A small town standard makes it to the big time.</Description>
                        </ContentMetaData>
                        <Series>
                              <SeriesName>Hello World, The Series</SeriesName>
                        </Series>
                  </ProgramContent>
            </Content>
      </ContentTransfer>
</BxfData>
</ BxfMessage>
```

5.7 Content Notify

Context of Use: A system that is capable of storing content must be able to communicate the inventory it contains. In most cases, this is an intelligent system that has “send” and “receive” capabilities, enabling effective transfer of this content.

Origination System: Content Delivery

Destination System: Automation

Trigger: Automation system is notified of arrival of new content.

Additional Stakeholders and Interests:

Automation User: Informs the traffic system of content that has been successfully delivered and is ready for use.

Traffic User: Keeps abreast of the changes of the status/location of content that is due to air.

Preconditions: Content needed for broadcast is unavailable

Main Success Scenario:

Traffic department:

1. Traffic user requests content items to be placed on a record order.
2. Traffic user submits record order to automation system.

Automation system:

3. Automation user acknowledges new order for recording of content.
4. Automation system submits status for record order to the traffic system.

Traffic system:

5. Traffic system accepts status and updates its database with the information from the automation system.
6. Use Case ends.

Example: Message notifying target of new content

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:F1234568-0022-92EE-9BA6-C293A1FA6693" messageType="Information" dateTime="2006-09-06T07:50:23.26" origin="Content Delivery System" originType="Content Delivery" destination="Traffic System" userName="Content Delivery System User" xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd">
<BxfData action="add">
      <ContentTransfer transferId="urn:uuid:FF56FE68-3D41-11DB-8AF6-B622A1EF5492" transferType="File transfer" priority="Normal" status="Completed" statusDescription="Content recently arrived--date and time reflected in the 'recordEventStart' and 'recordEventEnd' fields" recordEventStart="2006-09-06T07:50:23.26" recordEventEnd="2006-09-06T07:55:23.26">
            <Content location="http://edgeserver.com/incoming_files" source="Regional Distributor">
                  <ProgramContent>
                        <ContentMetaData>
                              <ContentId action="add">
                                    <Isan root="2B1A-FF17-3E20" episodeOrPart="6541" check1="7" version="48CD-78B1" check2="B"/>
                              </ContentId>
                                    <Name>The One With the Thumb</Name>
                                    <Description>Ross discovers the fate of his childhood pet, Chi-Chi.  Chandler starts smoking again; when the group complains, he diverts their attention to their own faults. Phoebe gets money she doesn't want; she complains and gets more; she gives it away and gets a can of soda in return...which contains a thumb. The beverage company gives her $7000. Monica's new boyfriend is a hit with her friends, but Monica's not too sure.</Description>
                        </ContentMetaData>
                        <Series>
                              <SeriesName>Friends</SeriesName>
                        </Series>
                  </ProgramContent>
            </Content>
      </ContentTransfer>
</BxfData>
</BxfMessage>
```

5.8 Query request

Context of Use: Any particular system might have the need to find out information that another system contains. Therefore, using the common xml schema amongst the participating systems, a SQL-like query is able to be used via a subset of XPATH 2.0 (http://www.w3.org/TR/xpath20/) to implement the <WhereClause> and <ReturnStructure> nodes syntax.

Origination System: Any

Destination System: Any

Trigger: The originating system desires to query the target system for useful information.

Additional Stakeholders and Interests:

Any/all

Preconditions: Information is needed that the originating system does not have and/or needs to verify from a target system

Main Success Scenario:

System A:

1. User of originating system A requests information from System B.

System B:

2. Performs a local query using the where-clause of the originating system's query
3. Returns the desired information to the originating system using the return-structure scheme

Examples:

1. All active channels for a given date range

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1" messageType="Request" dateTime="2006-08-16T20:44:43.16" origin="Traffic System" originType="Traffic" destination="Automation" userName="Traffic System User" xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd">
<BxfQuery>
        <WhereClause>Schedule/@scheduleStart="2006-08-16T05:00:00.00"</WhereClause>
        <ReturnStructure>Schedule/Channel/*</ReturnStructure>
</BxfQuery>
</BxfMessage>
```

Note: The "" indicates all sub-nodes at that level and below, if the "*" is omitted only that node and its attributes would returned.*

```
<!-- The above query would return all channels for which a schedule =2006-08-16T05:00:00:00.000 is defined. Returned record set would be something like:-->

<BxfMessage id="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391F2" messageType="Reply" dateTime="2006-08-16T20:44:50.16" origin="Automation" originType="Automation" destination="Traffic System" userName="Automation System User" originMessageId="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1" xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd">
```

```
      <BxfQueryResponse>
        <Schedule type="Primary" scheduleId="urn:uuid:00000000-0000-0000-0000-003833839122">
            <Channel>....</Channel>
        </Schedule>
        <Schedule type="Primary" scheduleId="urn:uuid:00000000-0000-0000-0000-003833839123">
            <Channel>....</Channel>
        </Schedule>
      </BxfQueryResponse>
</BxfMessage>

<!-- The Channel section is all optional, but the returning system would populate any channel attribute or elemental data it knows-->
```

2. Schedule identification for a given date range.

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1" messageType="Request" dateTime="2006-08-
16T20:44:43.16" origin="Traffic System" originType="Traffic" destination="Automation" userName="Traffic System User"
xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd">
<BxfQuery>
        <WhereClause>Schedule/@scheduleStart>="2006-08-16T05:00:00.00"</WhereClause>
        <ReturnStructure>Schedule</ReturnStructure>
</BxfQuery>
</BxfMessage>
```

Must return:

```
<BxfMessage id="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391F2" messageType="Reply" dateTime="2006-08-
16T20:44:50.16" origin="Automation" originType="Automation" destination="Traffic System" userName="Automation System User"
originMessageId="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1" xmlns="http://smpte-ra.org/schemas/2021/2008/BXF"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF
BxfSchema.xsd">
      <BxfQueryResponse>
        <Schedule type="Primary" scheduleId="urn:uuid:00000000-0000-0000-0000-003833839122">
        </Schedule>
        <Schedule type="Primary" scheduleId="urn:uuid:00000000-0000-0000-0000-003833839123">
        </Schedule>
      </BxfQueryResponse>
</BxfMessage>
```

***3.** Schedules for a specific **Channe**l for a given date range.*

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1" messageType="Request" dateTime="2006-08-
16T20:44:43.16" origin="Traffic System" originType="Traffic" destination="Automation" userName="Traffic System User"
xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd"
xmlns:pmcp="http://www.atsc.org/XMLSchemas/pmcp/2007/3.1"
pmcp:schemaLocation="http://www.atsc.org/XMLSchemas/pmcp/2007/3.1/pmcp31.xsd">
<BxfQuery>
        <WhereClause>Schedule/Channel/Name="WXYZ" and Schedule/@scheduleStart>="2006-08-
16T05:00:00.00"</WhereClause>
        <ReturnStructure>Schedule/*</ReturnStructure>
</BxfQuery>
</BxfMessage>
```

*This query would return schedules including all events for **Channel** Named "WXYZ" with a scheduleStart>='2006-08-16T05:00:00.00':*

```
<BxfMessage id="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391F2" messageType="Reply" dateTime="2006-08-
16T20:44:50.16" origin="Automation" originType="Automation" destination="Traffic System" userName="Automation System User"
originMessageId="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1" xmlns="http://smpte-ra.org/schemas/2021/2008/BXF"
```

```
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation=http://smpte-ra.org/schemas/2021/2008/BXF
BxfSchema.xsd" xmlns:pmcp="http://www.atsc.org/XMLSchemas/pmcp/2007/3.1"
pmcp:schemaLocation="http://www.atsc.org/XMLSchemas/pmcp/2007/3.1/pmcp31.xsd">
        <BxfQueryResponse>
          <Schedule type="Primary" scheduleId="urn:uuid:00000000-0000-0000-0000-003833839122">
              <Channel>
                  <pmcp:Name>WXYZ</pmcp:Name>
                      </Channel>
              <ScheduledEvent>…</ScheduledEvent>
                  </Schedule>
    </BxfQueryResponse>
</BxfMessage>
```

*4. Only "As Run" schedules on **Channel** WXYZ*

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1" messageType="Request" dateTime="2006-08-
16T20:44:43.16" origin="Traffic System" originType="Traffic" destination="Automation" userName="Traffic System User"
xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd"
xmlns:pmcp="http://www.atsc.org/XMLSchemas/pmcp/2007/3.1"
pmcp:schemaLocation="http://www.atsc.org/XMLSchemas/pmcp/2007/3.1/pmcp31.xsd">
<BxfQuery>
        <WhereClause>Schedule/Channel/Name="WXYZ" and Schedule/@scheduleStart="2006-08-
16T05:00:00.00"</WhereClause>
        <ReturnStructure>Schedule/AsRun/*</ReturnStructure>
</BxfQuery>
</BxfMessage>
```

***5.** Content Transfer Query – return status of all content transfers on the device specified as the message destination.*

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1" messageType="Request" dateTime="2006-08-
16T20:44:43.16" origin="Automation System" originType="Automation" destination="Content Transfer" userName="Content Transfer
System User" xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd">
<BxfQuery>
        <WhereClause>*</WhereClause>
        <ReturnStructure>ContentTransfer</ReturnStructure>
</BxfQuery>
</ BxfMessage>
```

Returns:

```
<BxfMessage ….>
        <BxfQueryResponse>
                <ContentTranfer transferId=.. transferType=… status=../>
                <ContentTranfer transferId=.. transferType=… status=../>
        …
        </BxfQueryResponse>
</BxfMessage>
```

5.9 Invoke Schedule

Context of Use: The traffic system is responsible for maintaining the composite programming schedule. This composite schedule would include any program elements, commercials, promotions, and other interstitial material. The schedule is transferred to the automation system which is responsible for the control of systems and equipment involved in playing the schedule to air over the **Channel**.

The Invoke Schedule example shows the activation of a schedule, which had previously been transferred to the automation system.

Origination System: Traffic

Destination System: Automation

Trigger: A previously-transferred schedule is to be activated for broadcast.

Additional Stakeholders and Interests:

Traffic System – Responsible for generating and disseminating the composite schedule. Traffic is also responsible for notifying the automation system of changes, and for bringing a new schedule into use to control a given **Channel** of playback.

Automation User- Receiving an accurate schedule in a timely manner such that it can be used to ready the schedule items for playback.

Master Control Operator- Wants accurate schedules and accurate data so the right content plays at the right time. The schedule activation from traffic to be available for visual verification and manual updates either directly in Traffic or via Automation.

Preconditions: A session has been established.

Main Success Scenario:

Invoke Schedule:

1. A request is sent for a particular schedule is activated. The schedule is identified by the *BxFMessage.Schedules.ScheduleID* attribute.

2. Automation validates the existence and state of the schedule referenced in the request. If validation of the request is successful, Automation sends an **ACK** (*BxFMessage.MessageType* = *acknowledgement*), and commences with the requested operation.

3. The outcome of the operation is conveyed back to Traffic in a **Reply** message generated by Automation, indicating result status in *BxFMessage.Status*.

Example: Message to automation to load the schedule into a usable playlist

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1" dateTime="2006-08-02T13:27:48.80"
messageType="Request" origin="Traffic System" originType="Traffic" userName="Traffic System User" destination="Automation"
xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd">
    <BxfData action="add">
        <Schedule type="Primary" scheduleId="urn:uuid:00000000-0000-0000-0000-0038338391E0" invokeSchedule="true"/>
    </BxfData>
</BxfMessage>
```

5.10 Heartbeat

Context of Use: Any system that is interested in communicating with another can verify that the target system is available to communicate messages. A heartbeat message can be used for this verification, thereby ensuring that messages can proceed between the systems.

Origination System: Any

Destination System: Any

Trigger: A system is interested in knowing the communication status of another system, so a heartbeat message is sent.

Additional Stakeholders and Interests:

Any/all

Preconditions: There is a need to determine whether a system of interest is available to communicate using BXF.

Main Success Scenario:

Traffic department:

1. Traffic user wants to utilize various use-cases for daily operations that include the Content Delivery system.
2. The traffic application submits a heartbeat message to ensure Content Delivery is available for messaging.

Content Delivery system:

3. Content Delivery receives the heartbeat message and responds if it is available to communicate with the inquiring system.
4. Use Case ends.

Example: Message to query the availability of a Content Delivery System:

```
<?xml version='1.0' encoding='UTF-8' ?>
<BxfMessage id="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1" dateTime="2006-08-16T20:44:43.16"
messageType="Heartbeat" origin="Traffic System" originType="Traffic" userName="Traffic System User"
destination="ContentDelivery" originId="urn:uuid:12345678-1234-1234-1234-123456789012" xmlns="http://smpte-
ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://smpte-
ra.org/schemas/2021/2008/BXF BxfSchema.xsd">
</BxfMessage>
```

5.11 As Run

Context of Use: Automation systems are supplied with events which are eligible for going to air. These events shall either be successfully played out or become a discrepancy. Both statuses are communicated to the traffic system and record appropriate reconciliation of the event. This use case covers the steps necessary for the communication about an event that has been aired, between automation system and the traffic system.

This communication has traditionally been in a 'batch' of events from the automation to the traffic system. Both a group of events or single event communication is supported.

Origination System: Automation

Destination System: Traffic

Trigger: An event is played out or marked as a discrepancy.

Additional Stakeholders and Interests:

Automation User: Reports the actual status of any event that it executes, or was planning on executing, back to the traffic system.

Traffic User: Is interested in the state of the originally planned schedule—needs to know, if/when billable spots have been properly executed on-air, as well as other planned/unplanned events. Takes responsibility to do an accurate accounting of what was scheduled versus what was aired.

Preconditions: Automation events are available for playout.

Main Success Scenario:

Playout:

Automation system:

1. Automation successfully executes the playout of an event.
2. Automation submits message to the traffic system with metadata for event.

Traffic system:

3. Traffic system accepts message and updates its reconciliation report (records status) with the information from the automation system.
4. Use Case ends.

Discrepancy:

Automation system:

1. Automation has discrepancy in automation event.
2. Automations submits message to the traffic system with metadata for event.

Traffic system:

3. Traffic system accepts message and updates its reconciliation report (records status) with the information from the automation system.
4. Use Case ends.

Example: Message sent by automation back to traffic after a program airs (matches to schedule example):

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1" dateTime="2006-09-05T13:38:26.28"
messageType="Information" origin="Automation System" originType="Automation" userName="Automation System User"
destination="Traffic System" xmlns="http://smpte-ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF BxfSchema.xsd"
xmlns:pmcp="http://www.atsc.org/XMLSchemas/pmcp/2007/3.1"
pmcp:schemaLocation="http://www.atsc.org/XMLSchemas/pmcp/2007/3.1">
      <BxfData action="add">
            <Schedule type="Primary" scheduleId="urn:uuid:00000000-0000-0000-0000-0038338391E0" scheduleName="WXXX Ch 6-
1" scheduleStart="2006-06-21T17:30:00.00" scheduleEnd="2006-06-21T18:00:00.00">
                  <Channel channelNumber="6-1" status="active" type="digital_television" ca="false" shortName="WXXX-DT"
outOfBand="true">
```

```
        <pmcp:Name lang="eng">WXXX-DT Ch 6-1</pmcp:Name>
    </Channel>
    <AsRun>
        <BasicAsRun>
            <AsRunEventId>
                <EventId>urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391F1</EventId>
            </AsRunEventId>
            <Content>
                <ContentId>
                    <HouseNumber>Network-1</HouseNumber>
                </ContentId>
                <Name>Evening News Segment-1</Name>
            </Content>
            <AsRunDetail>
                <Status>Aired Without Discrepancy</Status>
                <Type>ProgramHeader</Type>
                <StartDateTime>
                    <SmpteDateTime broadcastDate="2006-06-21">
                        <SmpteTimeCode>15:30:01:10</SmpteTimeCode>
                    </SmpteDateTime>
                </StartDateTime>
                <Duration>
                    <SmpteDuration>
                        <SmpteTimeCode>00:12:02:10</SmpteTimeCode>
                    </SmpteDuration>
                </Duration>
            </AsRunDetail>
        </BasicAsRun>
    </AsRun>
    <AsRun>
        <BasicAsRun>
            <AsRunEventId>
                <EventId>urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391F2</EventId>
                <BillingReferenceCode>JFMC1201-0012</BillingReferenceCode>
            </AsRunEventId>
            <Content>
                <ContentId>
                    <HouseNumber>JFMC1201</HouseNumber>
                    <AlternateId idType="ISCI" authorativeSource="AAAA">JFMC1201</AlternateId>
                </ContentId>
                <Name>Johnson Motors Super Sales Event</Name>
            </Content>
            <AsRunDetail>
                <Status>Aired Without Discrepancy</Status>
                <Type>BreakHeader</Type>
                <StartDateTime>
                    <SmpteDateTime broadcastDate="2006-06-21">
                        <SmpteTimeCode>15:42:03:20</SmpteTimeCode>
                    </SmpteDateTime>
                </StartDateTime>
                <Duration>
                    <SmpteDuration>
                        <SmpteTimeCode>00:00:30:00</SmpteTimeCode>
                    </SmpteDuration>
                </Duration>
            </AsRunDetail>
        </BasicAsRun>
    </AsRun>
    <AsRun>
        <BasicAsRun>
            <AsRunEventId>
                <EventId>urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391F3</EventId>
            </AsRunEventId>
            <Content>
```

```
                    <ContentId>
                        <HouseNumber>Network-1</HouseNumber>
                    </ContentId>
                    <Name>Evening News Segment-2</Name>
                </Content>
                <AsRunDetail>
                    <Status>Aired Without Discrepancy</Status>
                    <Type>ProgramHeader</Type>
                    <StartDateTime>
                        <SmpteDateTime broadcastDate="2006-06-21">
                            <SmpteTimeCode>15:42:33:20</SmpteTimeCode>
                        </SmpteDateTime>
                    </StartDateTime>
                    <Duration>
                        <SmpteDuration>
                            <SmpteTimeCode>00:09:28:03</SmpteTimeCode>
                        </SmpteDuration>
                    </Duration>
                </AsRunDetail>
            </BasicAsRun>
        </AsRun>
        <AsRun>
            <BasicAsRun>
                <AsRunEventId>
                    <EventId>urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391F4</EventId>
                    <BillingReferenceCode>FBIN0901-0001</BillingReferenceCode>
                </AsRunEventId>
                <Content>
                    <ContentId>
                        <HouseNumber>FBIN0901</HouseNumber>
                        <AlternateId idType="ISCI" authorativeSource="AAAA">FBIN0901</AlternateId>
                    </ContentId>
                    <Name>Discount Mortgage Promotion</Name>
                </Content>
                <AsRunDetail>
                    <Status>Aired with Duration Discrepancy</Status>
                    <Type>BreakHeader</Type>
                    <StartDateTime>
                        <SmpteDateTime broadcastDate="2006-06-21">
                            <SmpteTimeCode>15:52:01:23</SmpteTimeCode>
                        </SmpteDateTime>
                    </StartDateTime>
                    <Duration>
                        <SmpteDuration>
                            <SmpteTimeCode>00:00:29:25</SmpteTimeCode>
                        </SmpteDuration>
                    </Duration>
                    <EventNotes>
                        <EventNote>Upcut by switcher</EventNote>
                    </EventNotes>
                </AsRunDetail>
            </BasicAsRun>
        </AsRun>
        <AsRun>
            <BasicAsRun>
                <AsRunEventId>
                    <EventId>urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391F5</EventId>
                </AsRunEventId>
                <Content>
                    <ContentId>
                        <HouseNumber>Network-1</HouseNumber>
                    </ContentId>
                    <Name>Evening News Segment-3</Name>
                </Content>
```

```
                    <AsRunDetail>
                        <Status>Aired Without Discrepancy</Status>
                        <Type>ProgramHeader</Type>
                        <StartDateTime>
                            <SmpteDateTime broadcastDate="2006-06-21">
                                <SmpteTimeCode>15:52:31:18</SmpteTimeCode>
                            </SmpteDateTime>
                        </StartDateTime>
                        <Duration>
                            <SmpteDuration>
                                <SmpteTimeCode>00:07:28:05</SmpteTimeCode>
                            </SmpteDuration>
                        </Duration>
                    </AsRunDetail>
                </BasicAsRun>
            </AsRun>
        </Schedule>
    </BxfData>
</BxfMessage>
```

5.12 Playlist Update

Context of Use: During the airing of a broadcast channel/day it may be necessary to manage traffic events. This may be because of new information received for an event (i.e. a change in duration), or necessitated by adding, deleting or moving of a traffic event for operational reasons (which could include a **Makegood**, last minute program/break changes, copy change etc.). These could also be updates to content or the behavior of a traffic event (i.e. primary, secondary or linked events, etc.).

Origination System: Traffic

Destination System: Automation

Trigger: A change is made by the traffic user that impacts the channel/broadcast day.

Additional Stakeholders and Interests:

Automation User- Wants accurate information to track content from ingest to playout to deletion, and accurate timing for schedules. Reduce redundant tasks, enter data about events once (in Traffic) and share that data with other systems.

Master Control Operator- Wants accurate schedules and accurate data so the right content plays at the right time. Changes and updates from traffic to be reflected with accurate timing to reduce schedule running over/under.

Traffic User - Wants ability to easily have changes made to a schedule in the Traffic System reflected in the Automation system without additional manual processes.

Preconditions: A traffic event is updated for the channel/broadcast day.

Main Success Scenario:

Add/Move/Delete event:

Traffic System:

1. Traffic user changes a traffic event by moving, adding or deleting the traffic event.
2. Traffic system submits message to the automation system with metadata for event.

Automation System:

3. Traffic events are converted to automation events.
4. Automation system accepts message and updates the automation event with the information from the traffic system.
5. Use Case ends.

Update to event:

Traffic system:

1. Traffic user updates a traffic event (e.g. duration, secondary event(s), etc.).
2. Traffic user submits message to the automation system with metadata for event.

Automation System:

3. Traffic events are converted to automation events.
4. Automation system accepts message and updates the automation event with the information from the traffic system.
5. Use Case ends.

Update to content impacting a traffic event:

Traffic system:

1. Traffic user adds, deletes or modifies content in traffic system database.
2. Traffic system creates metadata for updated content in traffic database.
3. Traffic system submits message to the automation system with metadata for event.

Automation System:

4. Traffic events are converted to automation events.
5. Automation system accepts message and updates the automation event with the information from the traffic system.
6. Use Case ends.

Update to specified event behavior impacting a traffic event:

Traffic system:

1. Traffic user adds or modifies specified event behavior in traffic system database.
2. Traffic system creates metadata for updated event behavior in traffic database.
3. Traffic system submits message to the automation system with metadata for event.

Automation System:

4. Traffic events are converted to automation events.
5. Automation system accepts message and updates the automation event with the information from the traffic system.
6. Use Case ends.

Example: Message from Traffic to Automation to update a playlist schedule as to the location of content:

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:904e104a-3345-4261-bac3-da80bb988b6a" dateTime="2006-11-16T08:11:12.00"
messageType="Information" origin="Traffic System" originType="Traffic" userName="TrafficUser1" xmlns="http://smpte-
ra.org/schemas/2021/2008/BXF" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://smpte-
ra.org/schemas/2021/2008/BXF BxfSchema.xsd">
    <BxfData>
        <Schedule type="Primary" scheduleId="urn:uuid:00000000-0000-0000-0000-0038338391E0"
scheduleName="KXXX111706" scheduleStart="2006-11-17T17:30:00.00" scheduleEnd="2006-11-30T17:30:30.00">
            <Channel channelNumber="2-1" status="active">
            </Channel>
            <!-- This is an example of a schedule update for AlternateId, Name, Description of content based on HouseNumber,
scheduleStart and scheduleEnd -->
            <ScheduledEvent>
                <Content action="update">
                    <ContentId>
                        <HouseNumber action="update">90120</HouseNumber>
                        <AlternateId action="update" idType="ISCI">JFMC1205</AlternateId>
                    </ContentId>
                    <Name lang="eng">Johnson Motors</Name>
                    <Description lang="eng">Super Sales Event - Extended</Description>
                </Content>
            </ScheduledEvent>
            <!-- This is an example of a schedule update for MediaLocation based on scheduleStart and scheduleEnd -->
            <ScheduledEvent>
                <!-- Content element provided for readability only -->
                <Content>
                    <ContentId action="update">
                        <HouseNumber>90120</HouseNumber>
                        <AlternateId idType="ISCI">JFMC1205</AlternateId>
                    </ContentId>
                    <Media action="update">
                        <BaseBand/>
                        <MediaLocation>
                            <Location action="update">
                                <AssetServer fileTransferAllowed="true" playoutAllowed="true">
                                    <PathName>\\server2\content\commercials</PathName>
                                </AssetServer>
                            </Location>
                            <SOM>
                                <SmpteTimeCode>00:00:00;00</SmpteTimeCode>
                            </SOM>
                            <Duration>
                                <SmpteDuration>
                                    <SmpteTimeCode>00:00:30;00</SmpteTimeCode>
                                </SmpteDuration>
                            </Duration>
                        </MediaLocation>
                    </Media>
                </Content>
            </ScheduledEvent>
        </Schedule>
    </BxfData>
</BxfMessage>
```

5.13 Acquisition Failure

Context of Use: Content has been ordered to transfer between systems (transfertype=Duplication, Recording or File Transfer) and the action has failed for some reason. Because the traffic system has ordered the transfer, it is holding a place holder record in anticipation. The system tasked to execute the transfer is required to update the Traffic system in a specific way in the event of a failure

Origination System: Automation

Destination System: Traffic

Trigger: Transfer order received and acknowledged by automation.

Additional Stakeholders and Interests:

Automation User/Routine- Has been tasked to execute a content transfer. It is responsible for reporting the successful or unsuccessful conclusion of that task.

Traffic User – Has initiated a transfer order to automation and has generated a place holder record in its database in anticipation of a metadata update. On the occasion of a failure, it is required to manage the record, either to delete it or re-order the transfer.

Preconditions: There has been a transfer ordered (typically from Traffic to Automation) and the transfer was attempted.

Main Success Scenario:

Automation System:

1. A transfer order was received and action against is has commenced.
2. Something happens to cause the transfer to fail.
3. Automation system messages Traffic system to inform of failure

Traffic System

4. Traffic acknowledges the failure.
5. Updates its records to either remove the place holder or reissue the transfer order.
6. Use Case ends.

Example: Message from Traffic to Automation notifying the failure to acquire content:

```
<?xml version="1.0" encoding="UTF-8"?>
<BxfMessage id="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391F5" xmlns="http://smpte-ra.org/schemas/2021/2008/BXF"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://smpte-ra.org/schemas/2021/2008/BXF
BxfSchema.xsd" userName="AutomationUser" dateTime="2006-11-23T14:23:55" originType="Automation"
messageType="Information" origin="Automation System">

    <BxfData>
        <ContentTransfer transferType="File transfer" transferId="urn:uuid:ABCCDDDD-1111-22E3-9AFF-0038338391E1">
            <Content action="read" contentExists="false" error="system_unavailable">
                <NonProgramContent>
                    <Details>
```

```
                        <SpotType>Promo</SpotType>
                    </Details>
                    <ContentMetaData>
                        <ContentId>
                            <HouseNumber>ITVS_HYP</HouseNumber>
                        </ContentId>
                        <Name>ITVS HYPERBOLE</Name>
                    </ContentMetaData>
                </NonProgramContent>
            </Content>
        </ContentTransfer>
    </BxfData>
</BxfMessage>
```