Innovation in the newsroom
MOS Running Order Manager and its application
Ben Nuttall

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- Former Community Manager at Raspberry Pi
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- bennuttall.com
- twitter.com/ben_nuttall
- github.com/bennuttall
BBC News Labs

- Innovation team within BBC News & BBC R&D
- Prototypes of new audience experiences
- Solutions to help journalists
- Research and trying out ideas
- bbcnewslabs.co.uk
- twitter.com/bbc_news_labs
Radio 4 Today programme
The year is 1957...
The year is 2021...

"It stirred up lots of memories, what happened to Christian. I realised my career kind of evolved almost in a way, out of a need to have some kind of connection with his life."

@GabbyLogan tells @JustinOnWebb about the death of her brother Daniel from a heart condition.
# Production workflow - OpenMedia

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Here’s a 3 hour programme we made earlier
What if...

- What if we could enrich the digital offering by harvesting data from the running order?
What else...

- Once we’ve re-applied the data to the content, what else does this allow us to do?
Personalisation opportunities

- Instead of:  
  You might like...

- More personalised:
  You might like...
How do we extract running order data?

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Media Object Server (MOS™) Protocol v4.0

1. Introduction
### MOS files

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MOS files

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  <messageID>2812227</messageID>
  <roCreate>
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    <roSlug>0700 R4 TODAY Thu, 17.06.2021</roSlug>
    <roChannel>R4 News OnAir</roChannel>
    <roEdStart>2021-06-17T06:00:00</roEdStart>
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    <roTrigger/>
  </roCreate>
</mos>
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MOS files

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Process MOS files

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complete running order
mosromgr

- MOS Running Order Manager
- Open source Python library for managing MOS running orders
- Python 3.6+
- Apache 2.0 licenced
- [github.com/bbc/mosromgr](https://github.com/bbc/mosromgr)
- [mosromgr.readthedocs.io](https://mosromgr.readthedocs.io)
- [pypi.org/project/mosromgr](https://pypi.org/project/mosromgr)
- [bbc.co.uk/opensource/projects/mosromgr](https://bbc.co.uk/opensource/projects/mosromgr)
- [bbcnewslabs.co.uk/projects/mosromgr](https://bbcnewslabs.co.uk/projects/mosromgr)
What can mosromgr do?

- Merge MOS files into a complete machine-readable running order
- Provide easy access to the contents of a MOS file or a complete running order
- Python library and CLI
MOS Type Classes

```python
>>> from mosromgr.mostypes import *

>>> ro = RunningOrder.from_file('roCreate.mos.xml')

>>> ro
<RunningOrder 2812227>

>>> ss = StorySend.from_file('roStorySend.mos.xml')

>>> ss
<StorySend 2812227>
```
MOS Type Classes

```python
>>> from mosromgr.mostypes import MosFile
>>> ro = MosFile.from_file('roCreate.mos.xml')
>>> ro
<RunningOrder 2812227>
>>> ss = MosFile.from_file('roStorySend.mos.xml')
>>> ss
<StorySend 2812227>
```
MOS Type Classes - construction

```python
ro = RunningOrder.from_file('roCreate.mos.xml')

ro = RunningOrder.from_string(xml)

ro = RunningOrder.from_s3(
    bucket_name='newsnight',
    mos_file_key='20200101/roCreate.mos.xml'
)
```
MOS Type Classes - construction

class MosFile:
    def __init__(self, xml):
        ...

@classmethod
def from_file(cls, mos_file_path):
    ...
    if cls == MosFile:
        return cls._classify(xml)
    return cls(xml)

@classmethod
def from_string(cls, mos_xml_string):
    ...
    if cls == MosFile:
        return cls._classify(xml)
    return cls(xml)
MOS Type Classes - property access

```python
>>> from mosromgr.mostypes import RunningOrder
>>> ro = RunningOrder.from_file('123456-roCreate.mos.xml')
>>> ro.ro_slug
'22:45 NEWSNIGHT 54D CORE Thu, 08.04.2021'
>>> ro.message_id
123456
>>> ro.start_time
datetime.datetime(2021, 4, 8, 21, 46, 30)
>>> ro.duration
970.0
>>> len(ro.stories)
10
```
Escape hatch vs Ejector seat

>>> ro.xml
<Element 'mos' at 0x7f3236515c20>

>>> type(ro.xml)
xml.etree.ElementTree.Element

https://anvil.works/blog/escape-hatches-and-ejector-seats
MOS Type Classes - property access

```python
>>> from mosromgr.mostypes import RunningOrder

>>> ro = RunningOrder.from_file('123456-roCreate.mos.xml')

>>> story = ro.stories[0]

>>> story
<Story 5.604856.35>

>>> story.slug
'NEWS BULLETINS'

>>> story.duration
60.0
```
MOS Type Classes - property access

class RunningOrder:
    ...
    @property
def stories(self):
    story_tags = self.base_tag.findall('story')
    return [
        Story(story_tag)
        for story_tag in story_tags
    ]
Escape hatch vs Ejector seat

>>> story.xml
<Element 'story' at 0x7f323496bdb0>
>>> type(story.xml)
xml.etree.ElementTree.Element

https://anvil.works/blog/escape-hatches-and-ejector-seats

@ben_nuttall
Merge methods

```python
>>> from mosromgr.mostypes import *
>>> ro = RunningOrder.from_file('roCreate.mos.xml')
>>> si = StoryInsert.from_file('roStoryInsert.mos.xml')
>>> len(ro.stories)
10
>>> ro += si
>>> len(ro.stories)
11
```
Merge methods

class RunningOrder(MosFile):
    def __add__(self, other):
        return other.merge(self)

class StoryInsert(MosFile):
    def merge(self, ro):
        ...
        return ro
mosromgr documentation

mosromgr

Python library for managing MOS running orders. Pronounced mos-re-manager.

The library provides functionality for classifying MOS file types, processing and inspecting MOS message files, as well as merging MOS files into a running order, and providing a "completed" programme including all additions and changes made between the first message ( `notify` ) and the last ( `delete` ).

This can be used as a library, using the utilities provided in the mosromgr module, and the command line command `Command line interface` can be used to process either a directory of MOS files, or a folder within an S3 bucket.

This library was developed by the BBC News Labs team.

Example Usage

Command line

Note that the library is currently in beta. The API and CLI are not yet stable and may change. Once the library reaches v1.0, it will be considered stable. Please consider giving Feedback to help stabilise the API.
How do we utilise mosromgr in News Labs?
from mospipe.db import MosDatabase
from mospipe.processor import Processor
...

def lambda_handler(event, context):
    prefix = event['prefix']
    try:
        processor = Processor(bucket=BUCKET, prefix=prefix, live=True)
        processor()
    except Exception as e:
        db.jobs.update_status(prefix, status='failed')
    ...

if __name__ == '__main__':
    parser = argparse.ArgumentParser()
    ...
    processor = Processor(bucket=BUCKET, prefix=args.prefix, live=args.live)
    processor()
mospipe library

class Processor:
    def __init__(self, *, bucket, prefix, live):
        ...

    def __call__(self):
        self.merge()
        ...
        self.publish()

@property
def bbc_info(self):
    ...

@cached_property
def files(self):
    …
## Status dashboard

Running order status page

<table>
<thead>
<tr>
<th>RO ID</th>
<th>RO Slug</th>
<th>Files</th>
<th>Brand Title</th>
<th>Episode Title</th>
<th>First Seen</th>
<th>Last Seen</th>
<th>Warnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPENMEDIA_NCS/WT/BBC/MOSO4_A.5276015</td>
<td>1100 NEWS CHANNEL + BBC Two Thu, 17.06.2021</td>
<td>10</td>
<td>The Newsroom</td>
<td>17/06/2021 10:05 GMT</td>
<td>2021-06-17 09:54</td>
<td>2021-06-17 11:54</td>
<td>1 warnings</td>
</tr>
<tr>
<td>OPENMEDIA_NCS/WT/BBC/MOSO4_A.5276015</td>
<td>1100 NEWS CHANNEL + BBC Two Thu, 17.06.2021</td>
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</tbody>
</table>

---

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MOS Programmes Directory

Programmes

BBC News
BBC News at One
BBC News at Six
BBC News at Ten
Focus on Africa
Midlands Today
Midnight News
Newsbeat

Newsnight

Newsday
Newshour
Newsgame
Outlook

Politics Midlands
Six O’Clock News
The Andrew Marr Show

The Fifth Floor
The Newroom
The World Tonight
Today

Weekend
Woman’s Hour
World at One
You and Yours

Newsnight

16/06/2021
15/06/2021
14/06/2021
11/06/2021
10/06/2021
08/06/2021
07/06/2021
04/06/2021

03/06/2021
02/06/2021
01/06/2021
28/05/2021
27/05/2021
26/05/2021
25/05/2021
24/05/2021
21/05/2021
20/05/2021
19/05/2021
18/05/2021

@ben_nuttall
MOS Programmes Directory

Newssight: 16/06/2021

MENU

PRE-TITLE TEASE
The US President meets the man he called a killer face to face. Does Russia Or America need the more?

POST-TITLE "ALSO TONIGHT"
Biden and Putin discuss keeping critical infrastructure - like energy and water - off limits to cyberattack. How does that deal work? If you don’t trust the guy who’s said it?

ALSO TONIGHT
An exclusive investigation into sexual misconduct by police officers has found that there have been almost 1,500 allegations of wrongdoing across Britain in the last 5 years. So what happens when things go wrong?

AND

Assem Harpos is in Kent where the Council is facing a desperate effort to find the resources to shelter and house hundreds of unaccompanied child migrants.

BIDEN/PUTIN

BIDEN/PUTIN-INTRO
Good Evening. Last time a US president and a Russian president met it was in Helsinki. It was bizarre. And it was unforgettable. Donald Trump met the guy he had no reason to suspect Russia of election meddling and he believed Vladimir Putin more readily than America’s own security and intelligence agencies. So in some ways the bar for Joe Biden was set pretty low. And this president was in no hurry to raise expectations. He warned that this was no meeting of friends. There is little trust between America and Russia right now. But it was a meeting of strategic minds. There are areas on which both can benefit from agreement. And so they talked together - and to the press, separately. Joe Biden raised the case of jailed opposition leader Navalny - warning of terrible consequences if he died in prison. And mocked Putin for comparing that to the uprising on the Capitol on 6th January. So who needs more out of this relationship? And can they find one? Newsnight’s Emily Maitlis. (14g).

BIDEN/PUTIN-INTRO [2]

AND JOINING US NOW WE HAVE Nina Yanco-Witz, a cyber-security and disinformation specialist and a fellow at the Wilson center and we have Thomas Graham, a former white house advisor on Russia and a senior director for Russia on the National Security Council.

<1. Nina Yanco-Witz who needs more from this? Push or IT?00>
Automated chapterised content
## Automated chapterised content

**Released On:** 17 Jun 2021  **Available for 29 days**

News and current affairs, including Sports Desk, Weather and Thought for the Day.

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Headlines</td>
<td>120:00</td>
</tr>
<tr>
<td>2</td>
<td>Help for business enough?</td>
<td>130:01</td>
</tr>
<tr>
<td>3</td>
<td>Influencer rule-breakers to be named</td>
<td>141:00</td>
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<tr>
<td>4</td>
<td>Sport news</td>
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<td>News summary</td>
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<td>8</td>
<td>Older people impacted by economy</td>
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<tr>
<td>9</td>
<td>Tigray humanitarian crisis</td>
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<tr>
<td>10</td>
<td>Children's social care under significant strain</td>
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<tr>
<td>11</td>
<td>Picture books</td>
<td>174:40</td>
</tr>
</tbody>
</table>

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Slicer

Title

Headlines

Synopsis

Headlines and news bulletins at eight o'clock on Thursday 17 June

Segment ID 1719435

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What next?

- Gather feedback from other broadcasters to ensure the library is compatible with other systems and workflows
- Roll out automated chapterisation for other programmes, including TV shows like Newsnight
- Provide accessible programme data from running orders as a service within the BBC
- More OBM projects demonstrating opportunities e.g. personalisation
Innovation in the newsroom
MOS Running Order Manager and its application