the future of broadcasting services

challenges and opportunities

context

media technology developments shaped by the context of the external environment cause changes to society more than any specific content that the media itself carries

context

what's the media context

technology change is normal what's new is the rate of change

- user devices are matching professional device quality
- social media and streaming services are rapidly reacting to user needs
- gaming consuls render photorealistic images in real time
- light-field and volumetric capture create realism in any 3D space
- close to 7 billion smart phones in use in 2023 (but poorly distributed)
- competition is driving change at increasing rate

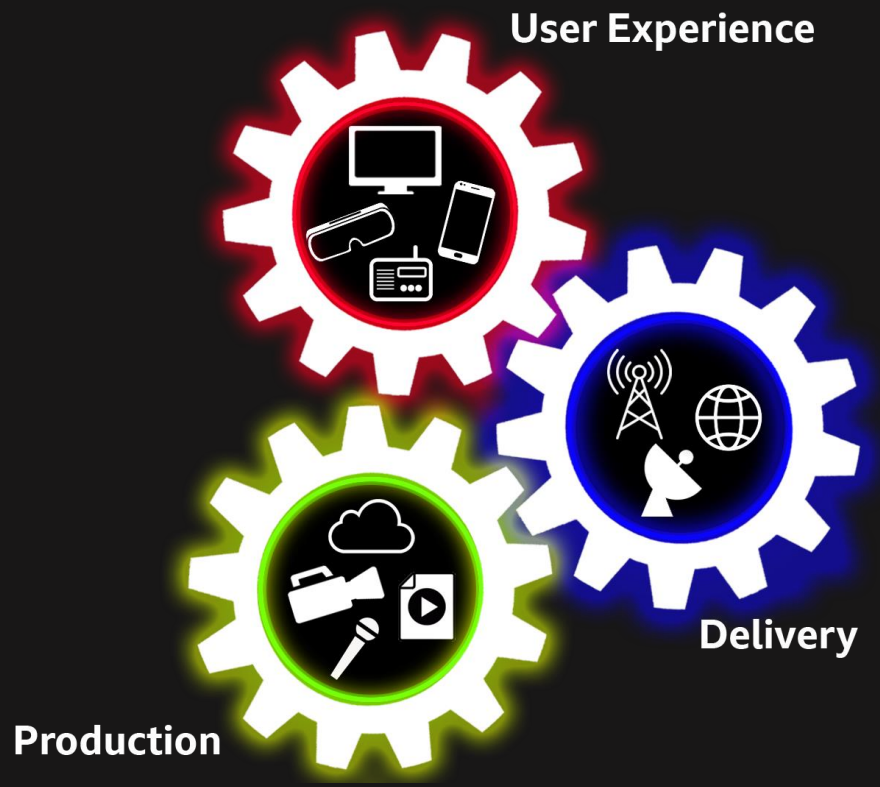
To have the same "computing power" as a 160 gram iPhone 12, the 1980 Cray-2 super computer would weigh 12.5k tonnes and occupy 7 500m²

landscape

users-production-delivery

interconnections

- the media model *was* unidirectional
  - first - production to audience
  - later - audience to production
  - but always too slow and too late!

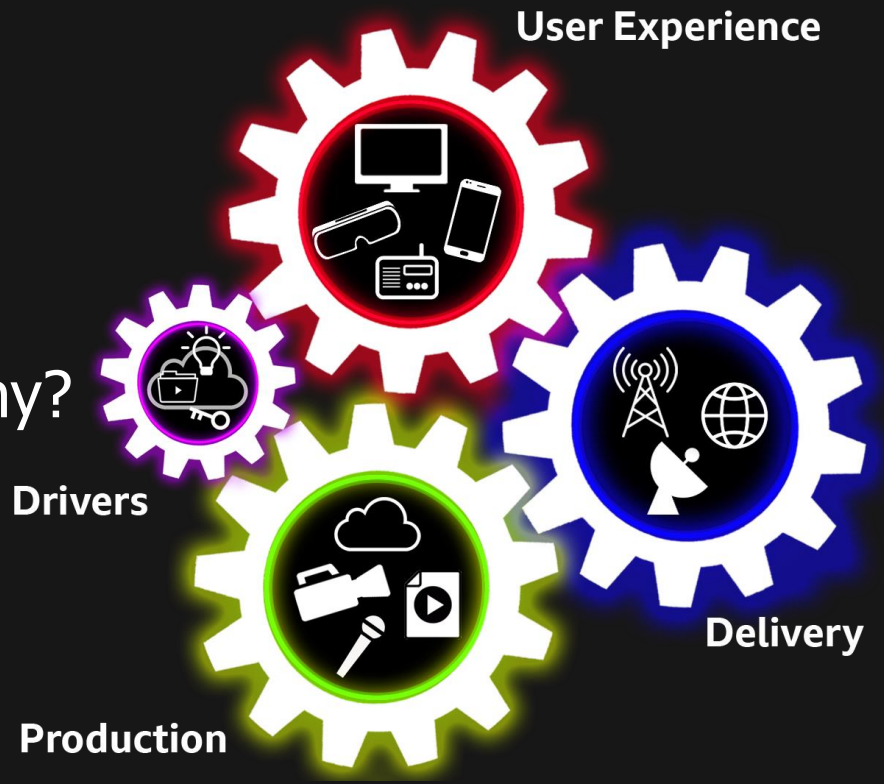


landscape

users-production-delivery

interconnections

- the media model *was* unidirectional
  - first - production to audience
  - later - audience to production
  - but always too slow and too late!
- the media model must be bidirectional – why?
  - to handle the competition
  - to incorporate user generated content
  - to interact with social media
  - to maintain rights and minimize piracy
  - to learn from gaming technologies and players
  - to exploit smart tv's expanding choice options

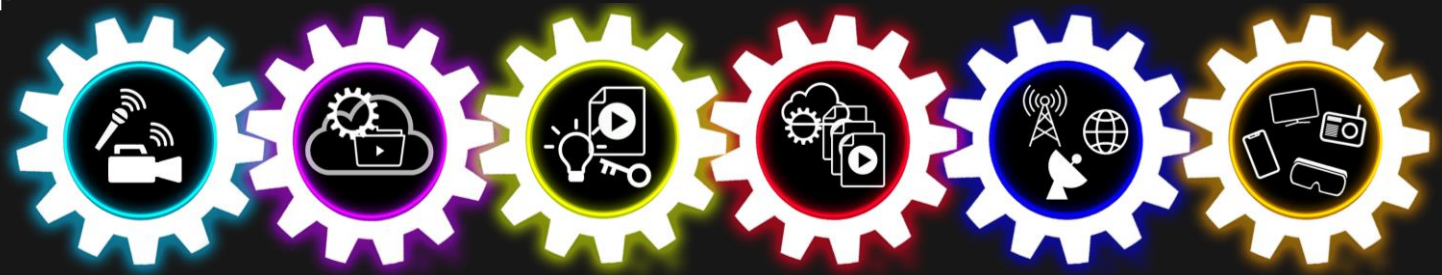


commodity

media is a commodity

the media supply chain

- applying business system design to the end-to-end media chain is vital
- knowing the audience is the same as knowing any retail customer
- rights, permissions and licensing integrated into exchange and delivery
- enabling block-chain commerce processing for;
  - access and sharing control
  - rights to process and exchange
  - identification of ownership
  - live sports access
  - geolocation control
  - and that's just the start!



user trends

trends

what's happening?

seven key user trends

- collective experience
- immersive experience
- personalized experience
- accessible experience
- ubiquitous experience
- digitally assisted experience
- merging physical and digital worlds

audience

what's happening?

seven key user trends

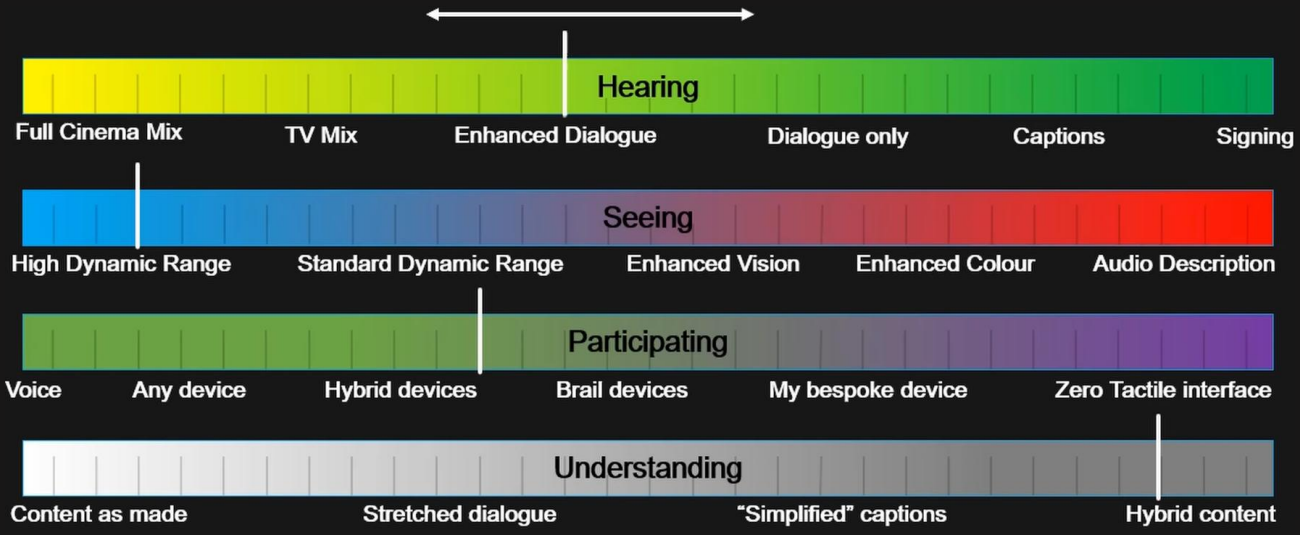
- collective and immersive experience
  - collective: bbc-together, teleparty, netflix party,hulu watch party, disney groupwatch…
  - immersive audio: dolby atmos, mpeg-h, 5.1, 22.2….
  - collective and immersive: a new experience already normal in gaming

audience

what's happening?

seven key user trends

- personalized and accessible experience
  - seeing – colour compensation, photosensitive epilepsy, contrast ratio, audio description
  - hearing – dialogue enhancement, captions, signing
  - participating – voice control, gaze action, haptic interaction
  - understanding – simplified text, perception enhanced, language, autism adaptation



audience

what's happening?

seven key user trends

- ubiquitous, assistance and merged experiences
  - any device at any time in any location
  - hand-off between platforms and between devices
  - recommendations for new content
  - reminders for favourites
  - intelligent navigation and data aggregation
  - alerts of 'appointment-to-view' on any device
  - integration into social media apps
  - link my device set-ups to my preferences

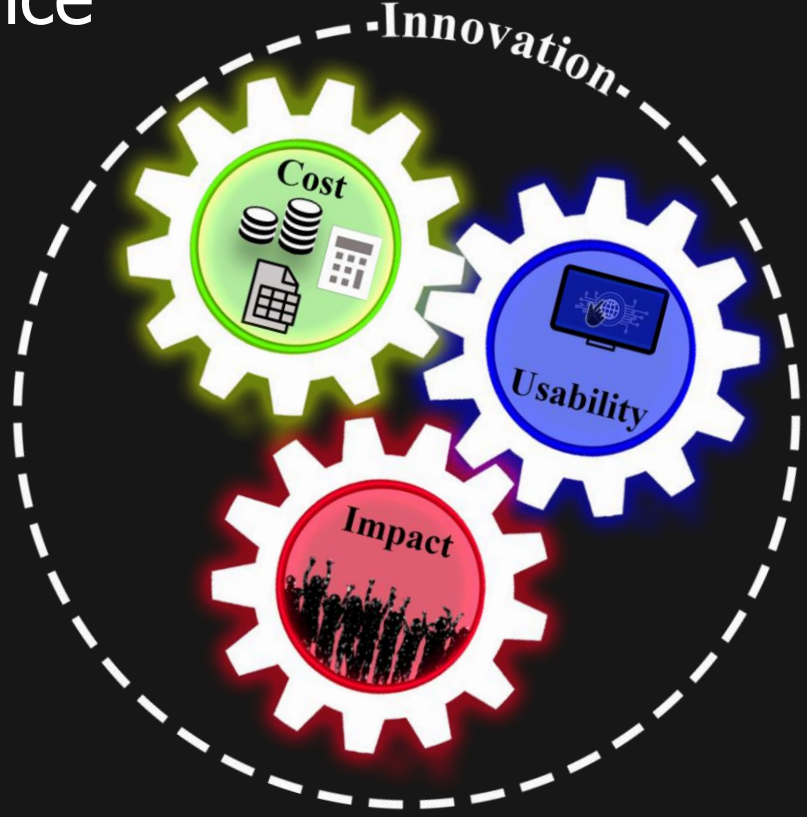
production trends

production

technology issues programme makers face

cost vs. ease of use vs. impact to audience

- cloud native workflows
- virtual & remote working
- accessible for all users
- personalized on any device anytime
- data driven from source to user
- immersive exploiting 3D spaces
- interactive at personal & group levels
- targeting zero emissions

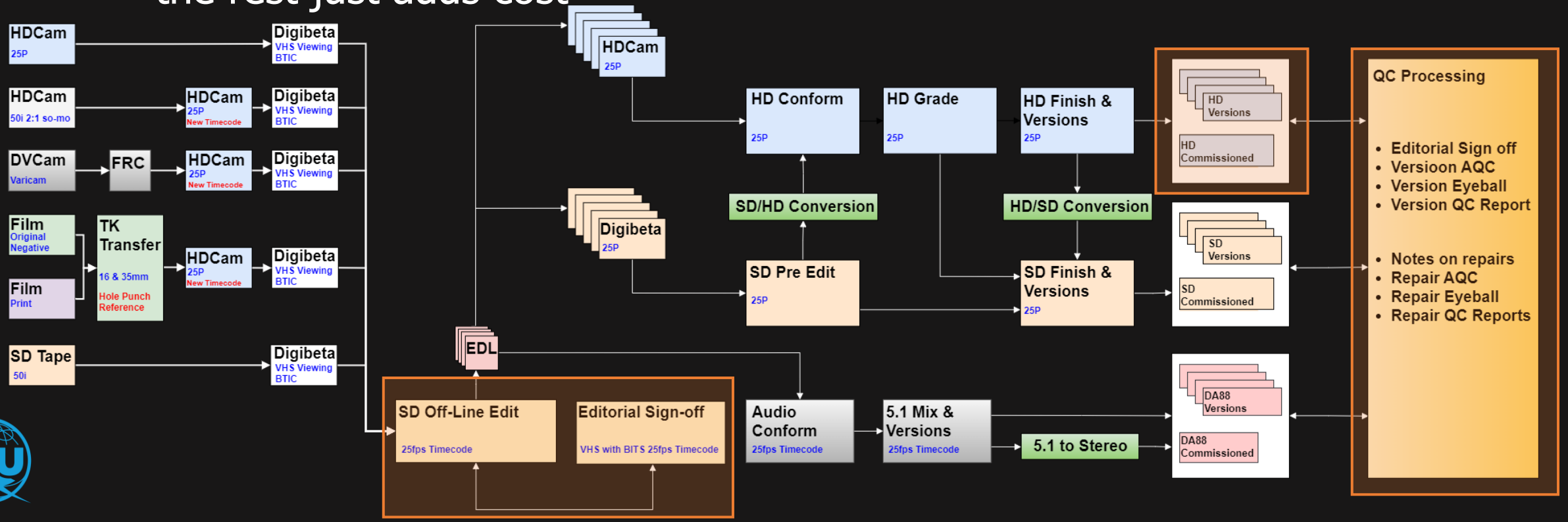


workflow

linear content exchange is not simple

linear workflows mostly format transfers and copying

- editorial possessing creates value
- the rest just adds cost

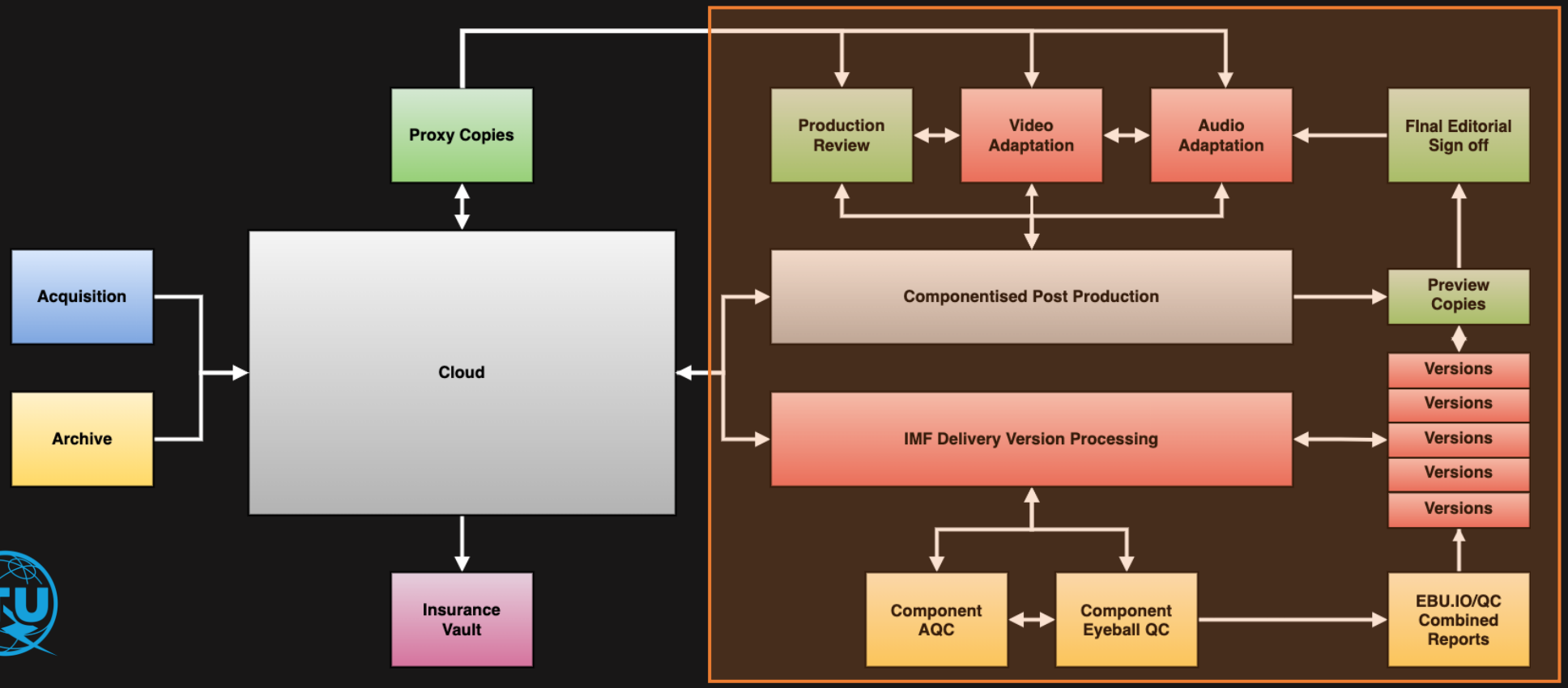


workflow

virtual content exchange could eliminate cost & complexity

cloud based virtual workflows minimize non-value processes

- additional value from sustainable, personalized, accessible content

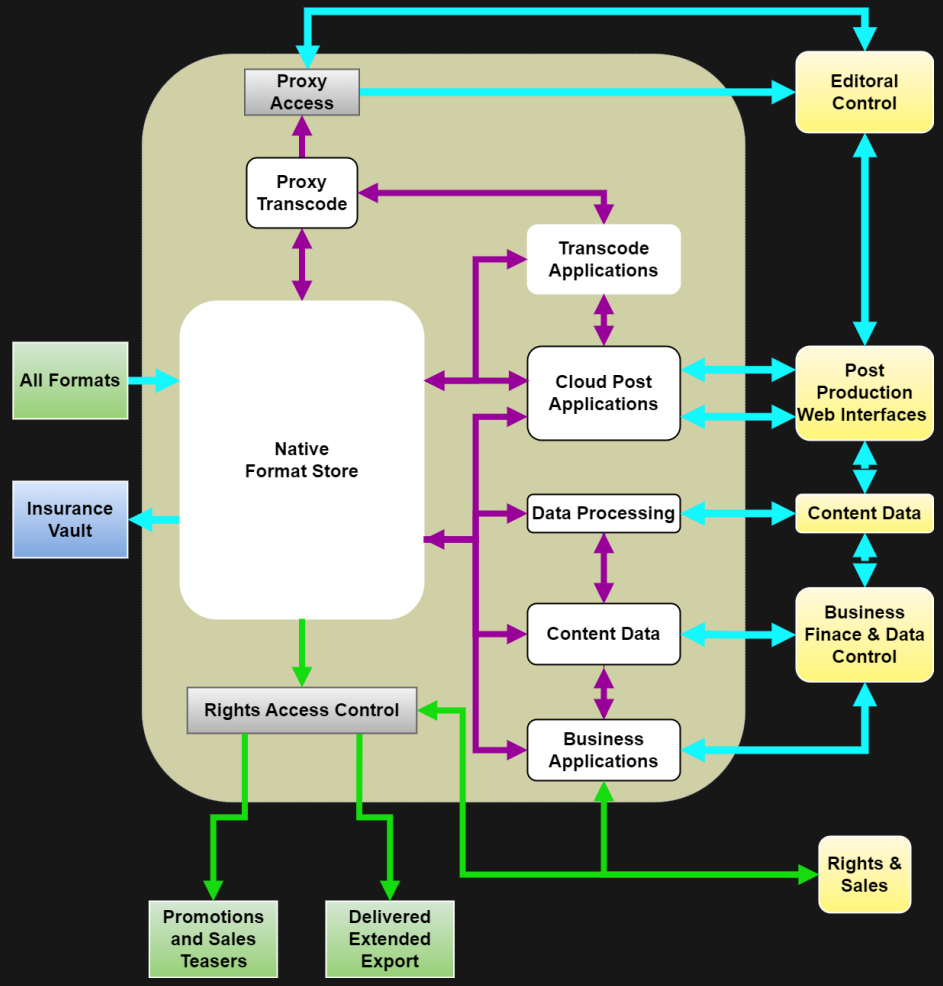


workflow

virtual cloud content workflow

software as a service

- minimizes physical broadcast infrastructure
- combines production & business processes
- commodity based supply chain working
- full access and process control
- change of finance from capex to opex
- new infrastructure planning models
- local or remote storage options
- scope 3 sustainability models
- content versioning workflows

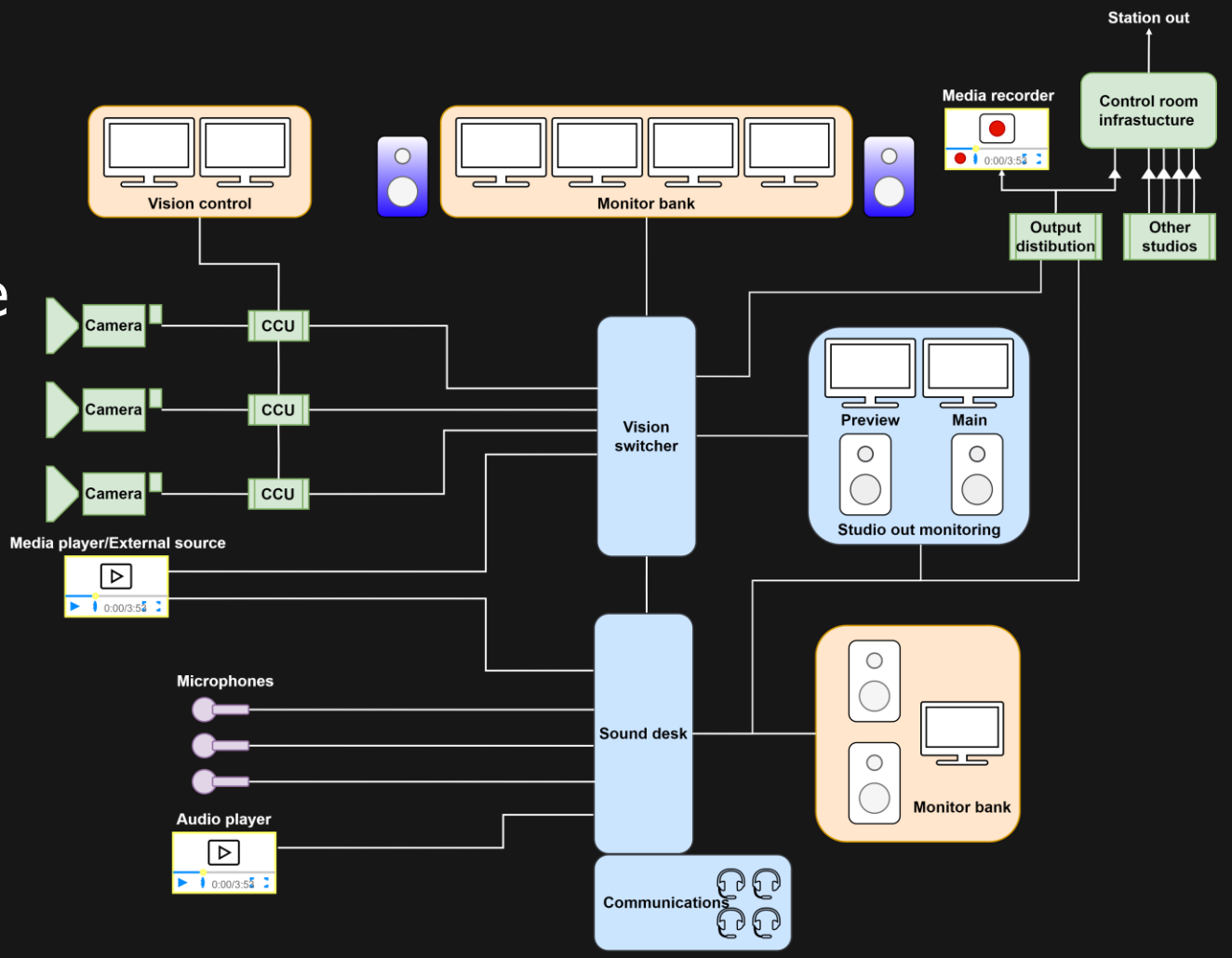


remote

virtual cloud live workflow

traditional studio overview

- fixed to a performance area
- very little change from analogue
- built around fixed infrastructure
- all or nothing usage model

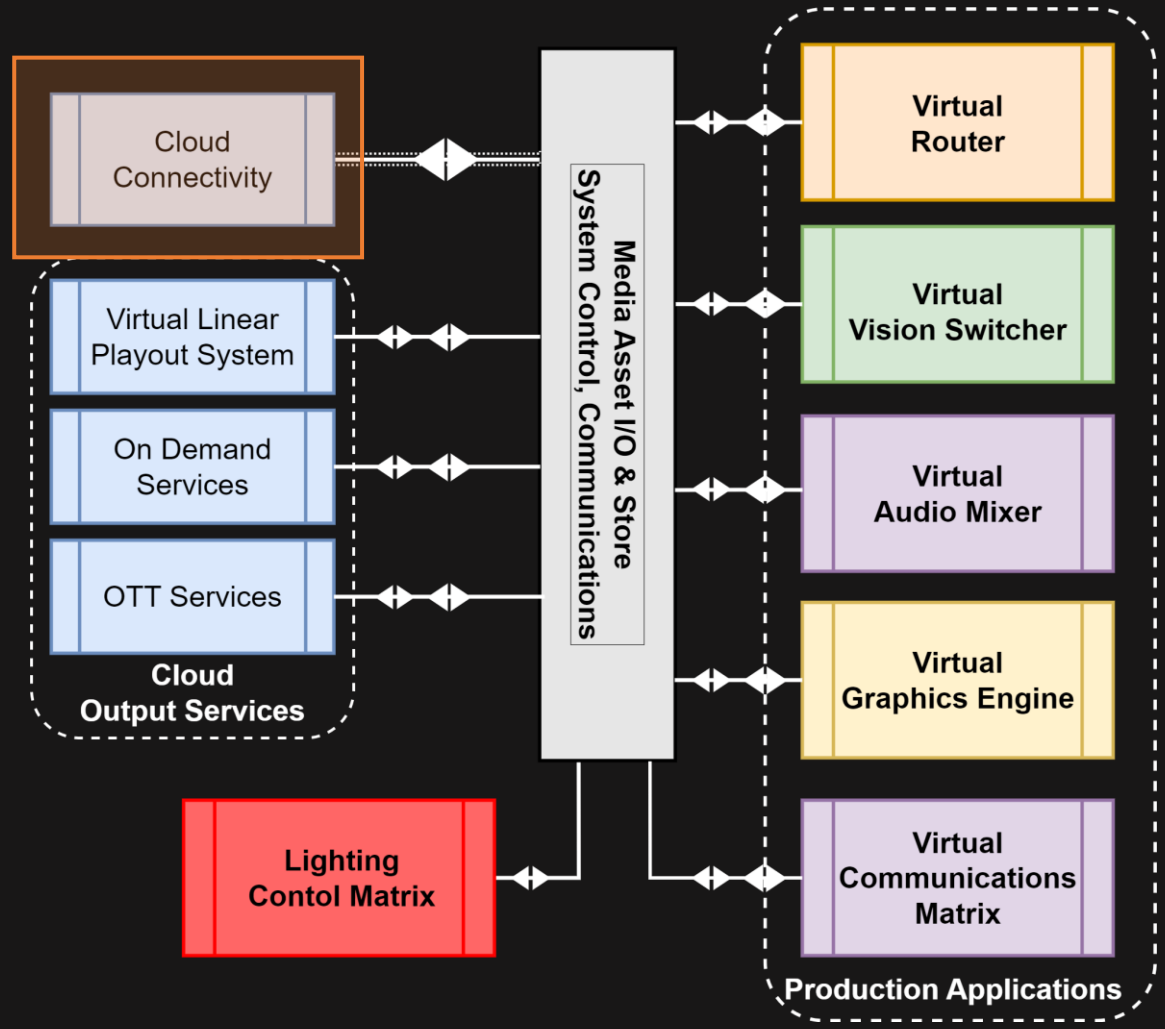


remote

virtual cloud live workflow

virtual studio overview

- any performance area any location
- requires minimal infrastructure
- minimize unused applications
- fully flexible usage model
- diverse remote operations

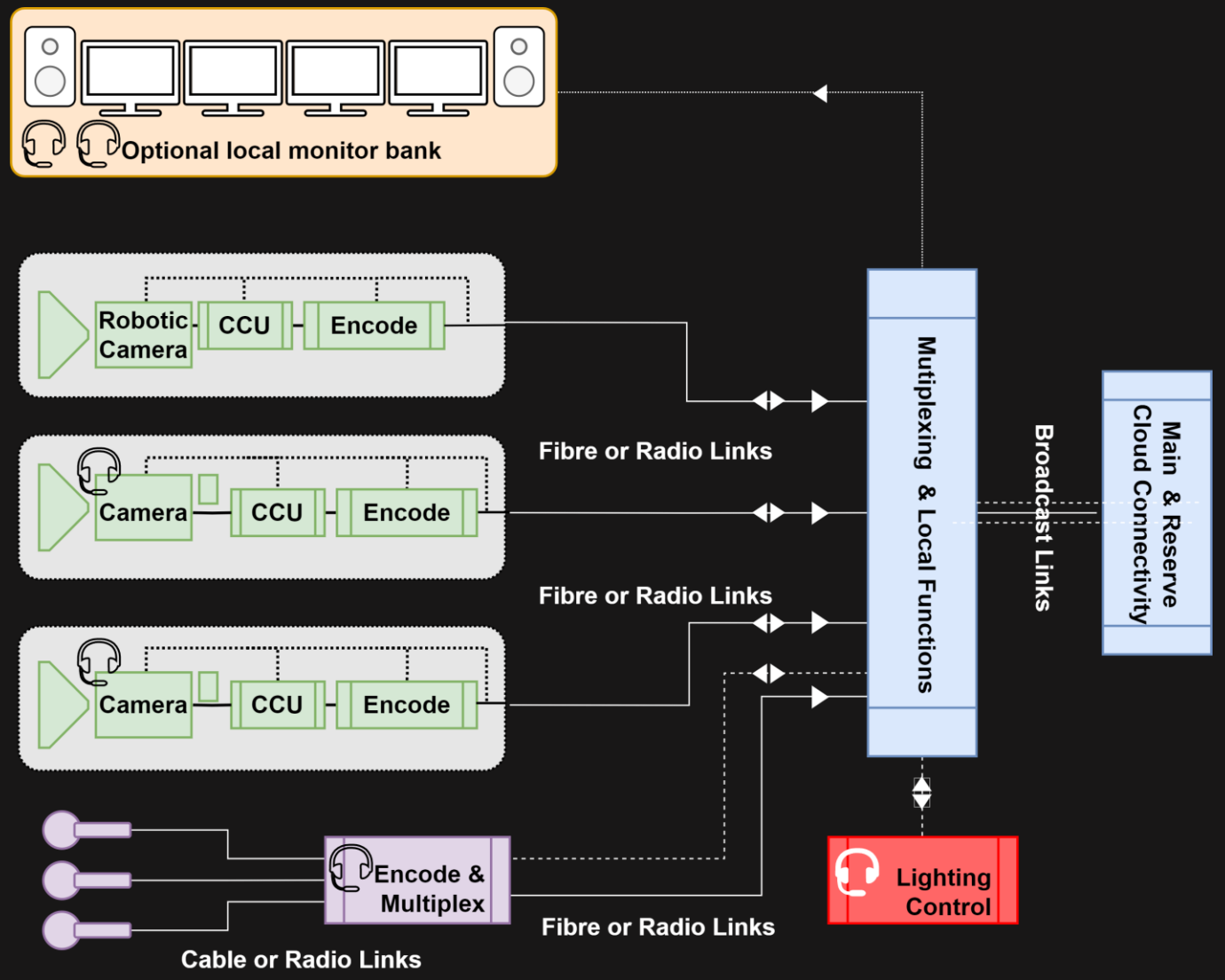


remote

virtual cloud control

virtual location operations

- minimal infrastructure
- minimize location staff
- very fast rig & de-rig
- expandable operational model
- lower power requirements
- local private 5G network
- work with any control area



remote

virtual cloud control

virtual studio operations

- any connected device
- single person operation possible
- multi-location operation possible
- expandable operational model

data

data driven workflows

audio and video are just more data!

- data is just a important as audio and video
- data enables and drives automation
- data enables access and rights control
- data tracks tasks and processing
- data links production and business systems
- data is essential for ‘complex media’
- data is a security risk that must be managed

security

data driven disasters?

if audio and video are just more data

- they are more venerable to cyber attacks
- they are easier to copy and pirate
- they are more vulnerable to misuse

but, they can be protected by

- using business system security protocols
- application of zero-trust policies
- authorization access control
- employing processing control permissions

objects

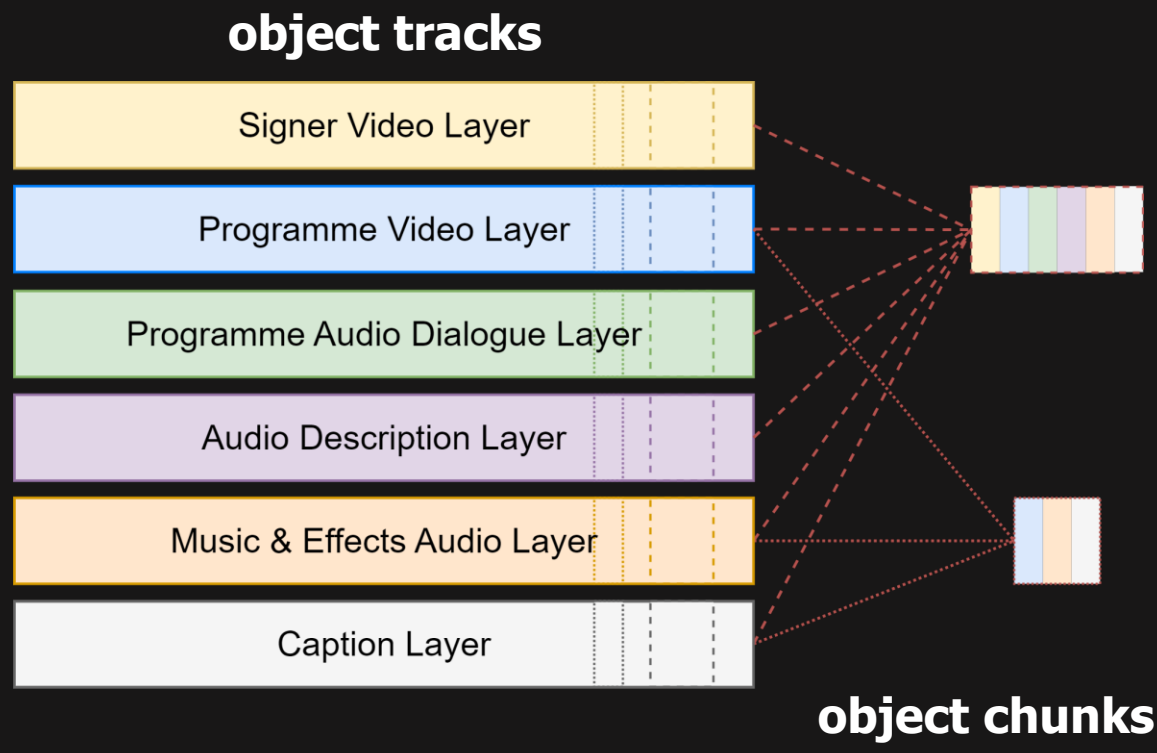
media as objects

what is a media object?

- a whole track
- a programme segment
- a single shot or audio clip
- a single person in a shot
- a sound effect

why would objects be useful?

- versioning for sale or multiple platforms
- archiving and reuse of clips by others
- changes and re-edits
- promos and social media ‘extras’

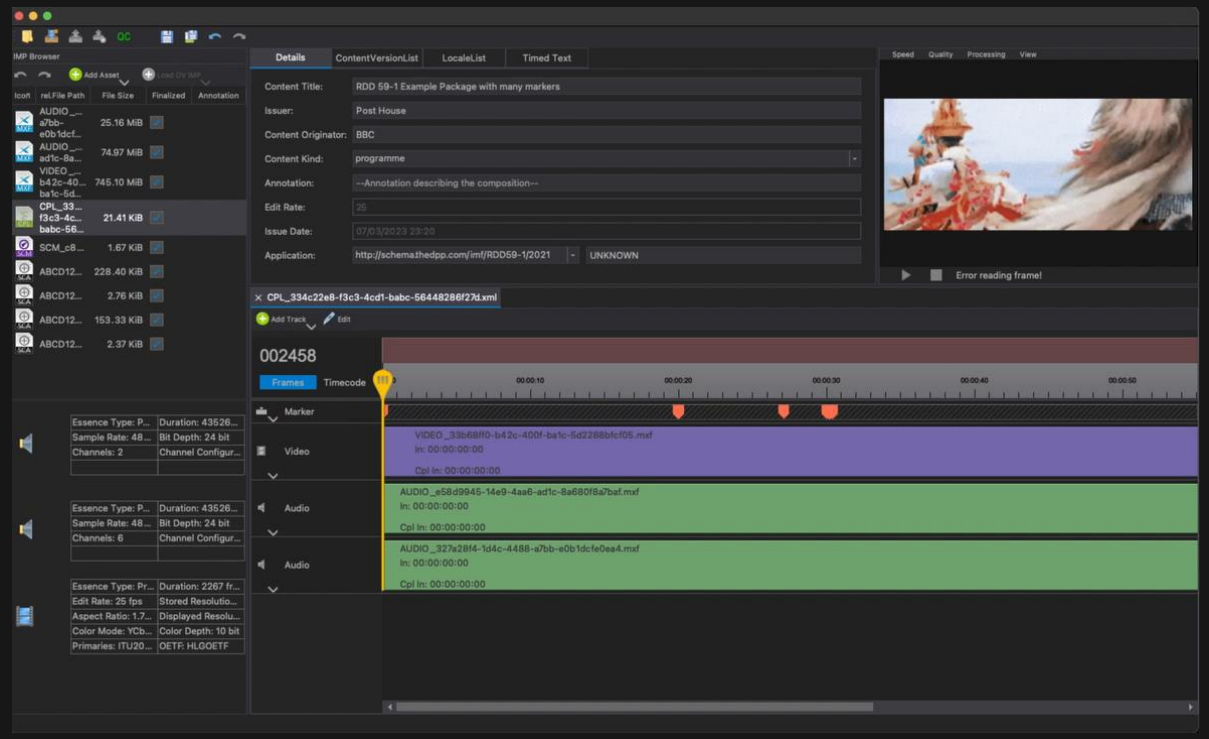


components

objects as components

what is componentized programme package?

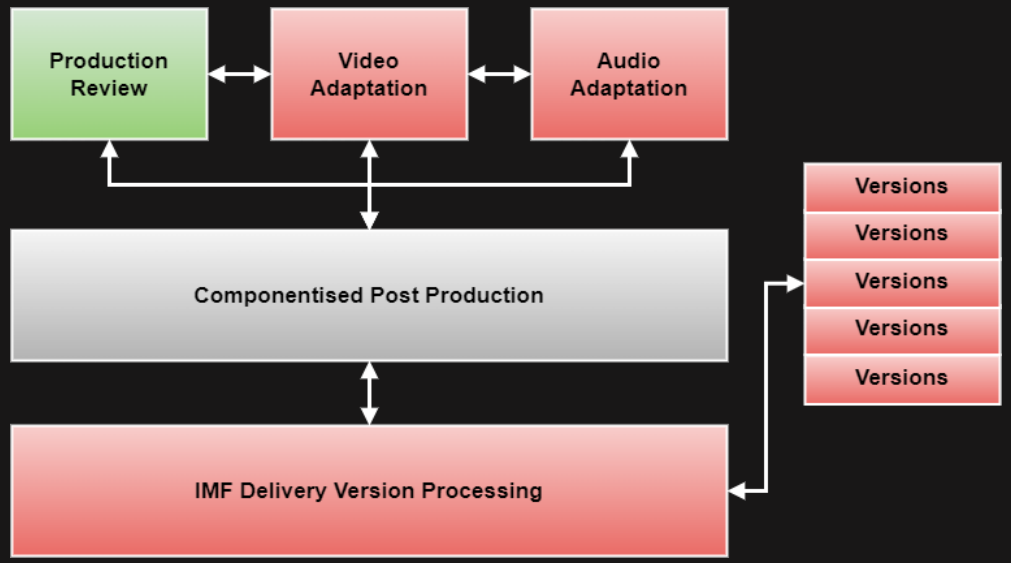
- interoperable master format – know as ‘imf’
- a collections of audio, video and data mxf and xml objects
- orchestrated by xml play lists
- no media file duplication
- open-source tools
- supported in nle applications



components

objects as components

componentized workflow



recommendation itu-r bt.2153

report itu-r bt.2400 Annex 2

smpte st 2067 suite

ai

artificial intelligence - a tool or a disruptor?

creative intent

- ai used to create content with no brief will create what ai wants to watch!
- ai used to assist content creation is a powerful tool
- ai used to make links and connections is totally invaluable in production
- ai used in production applications – we will explore today

ai tools for media

a concern or an assistant?

- just an extension of existing tools?
- simple text instructions – could be voice instructions too
- as part of a family of media tools,
  - the combination of options makes is very powerful
  - simple transitions between the family
  - being familiar with one of the family makes training easy

this is not an adobe commercial!!!!!!!

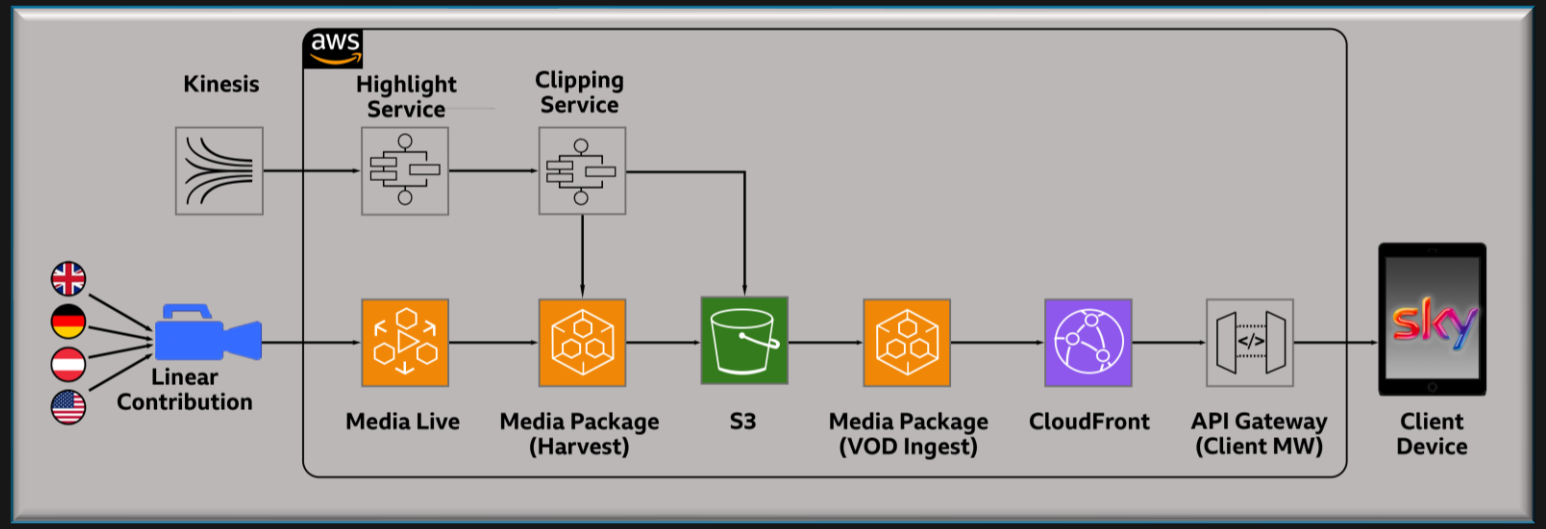
- avid, final cut, resolve…. all include ai tools now

users

ai tools extended to the home

opportunities to attract a new audience

- not just navigation and assistance
- main use currently – sport
  - sky uk using AI automation to enhance sports highlights packages
  - aws cloud of saas solutions for analysis and processing VOD highlights
  - multiple territory localization using territory specific streams

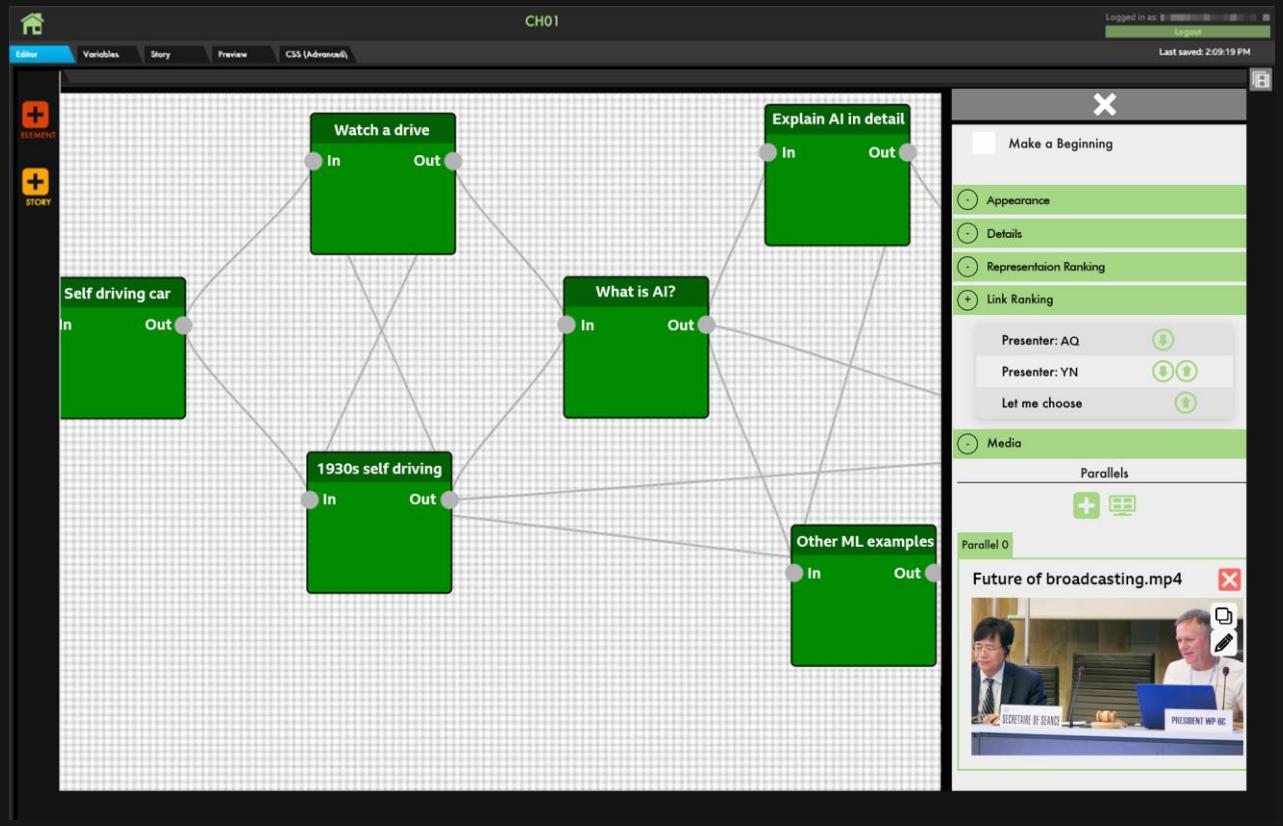


complex

what and why complex media!

take media as objects, components and ai together

- allow the audience to choose how the narrative evolves
- create complex stories
- guide the narrative
- add game play
- learn from the audience
- apply new tools
- open source is normal
- but choose very carefully



delivery trends

delivery

audience and production expectations evolving rapidly

delivery systems must evolve

- hybrid systems already in use or development stages
  - atsc 3.0, tv3.0, dvb-nip, 5g/6g, ibb systems…
  - hybrid delivery systems appear to offer required advantages
  - administrations must plan for consumer inertia and resistance
- planning for multiple devices and capabilities
  - systems must maintain or improve current quality and content expectations
  - acknowledge content adaptation will be needed in the delivery chain

delivery

audience and production expectations evolving rapidly

introducing new delivery systems

- backward compatible?
  - back compatible allows long change over planning
  - can be initiated before user devices are easily available
  - communication difficult where new devices have new features and older devices don’t
  - full implementation of future features may not be possible
- non-backward compatible?
  - needs simulcast for extended periods or support to users to switch devices
  - must have significant device availability at time of launch
  - must include significant benefits to all users
  - include contingency planning for consumer reaction to switch off of old services

delivery

audience and production expectations evolving rapidly

introducing new delivery systems

- broadcasting in times of crisis
  - requires robust infrastructure
  - must have a maximum coverage potential
  - essential it is easy to receive
  - capable of surviving extended local power outages
  - is high-tower, high-power the best answer or can 5g/6g cope from launch?
  - data options are essential for a fully accessible information system

to sum up

trends

technology acceleration

what's on the way out

- time shifting – restart this programme, personal catch-up apps…
- electronic programme guide – my personal assistant, my home page…
- video on demand – anytime, anywhere any device, hand-off…
- accessibility – personalized media
- channels – curated content services
- what else – can you give me more?

next?

who and what will drive change?

users

- user expectations is driving change in media creation and delivery
- growing expectation to access on any device, in any location, at any time
- there is still a desire for communal and shared media consumption
- users want to be stimulated by increasingly immersive content
- content presented according to personal preferences

timescale

this will not happen all at once

adoption of new technologies over time depends on

- society served by media organizations
- availability of affordable user devices
- level of infrastructural change required
- technological fashion
- challenges faced by media providers
- mean there will be a right time for new technology

What will not change is emotional impact that the combination of story telling, innovation and technology can deliver to the audience