



White Paper

Integrated Platform for Content Assembly and Distribution in a Multi-Screen World

Written for presentation at the SMPTE 2010 Fall Conference.

Preface

In today's multi-screen world, maximizing the potential revenue streams for media is a constant and growing challenge. The proliferation of broadcast delivery platforms along with the diversification of program genres and channel types means that taking new channels to air presents many new and different types of issues for both large content aggregators as well as new low cost start ups.

Add to this, the fact that many stations are still moving from analogue to digital, as well migrating from standard to high-definition and the challenge becomes even more daunting.

This paper looks at the technology, including the Channel in a Box approach, to facilitate delivery of both small and large numbers of channels in a cost effective manner.

Introduction

The broadcast industry has never been more fluid and dynamic. Convergence of traditional IT, broadcast and telecoms technologies continue to blur the boundaries.

Broadcast traditionalists tasked with product development and bringing these products to market may see many conflicts around the choice of IT platforms, operating systems and appropriate fit for purpose hardware and software. The \$64,000 question is whether these organisations can create products that their customers find appealing and affordable before the technology evolves on to the next platform.

Viewed in a different way, this diversity of technology offers many opportunities to develop and bring to market ground breaking concepts and solutions, which have, and will continue to change the landscape we all work in.

At the consumer level the continual drive to monetize content to the maximum, re-purposing, re-delivering, creating new channels, and new business models and new consumption trends is placing unprecedented demands on the technology and the products we use.

The successful harnessing of this technology is key to realizing and exploiting the multi-screen world with media consumption any time, on any device and anywhere.

Facing up to the challenges of a multi-screen environment

The multi-screen environment requires a very different approach and outlook for commercial success. It presents new and distinct challenges to all the key stakeholders in the media supply chain.

Content creators must ensure that the content they create can be utilized in the multi-screen world as simply and as efficiently as possible. In a world where we have seen an explosion in content they have to ensure that the content stands out not only today, but also in the future and on different devices and platforms, from 4K digital cinema to mobile screens such as smart phones.

Content should be created with inherent and enduring value. Can it easily migrate from SD to HD, and what are the implications of 3D?

Content owners possess valuable assets, but the key is to be able to unlock and exploit the value as efficiently as possible. If you do not know what you have got, where it is and whether you have the rights to use it, then it is of no value to you. Your archive will probably be made up of a combination of tape and file based assets; judicious use of metadata can help ensure that you have the most essential pieces of information so that the content can be exploited time and time again on current platforms, new platforms, on demand, basically anywhere in the multi-screen world.

Despite the proliferation of Media Asset Management Systems on the market, many content owners fail to exploit their archives in an efficient manner. There is still much work to be done in this area.

Platform owners of all types face the biggest challenge, especially with regard to large content aggregators. The explosion in the number of channels, the introduction of new platforms and the start of on-demand services, as opposed to scheduled linear delivery, has led to a significant increase in technical and operational requirements.

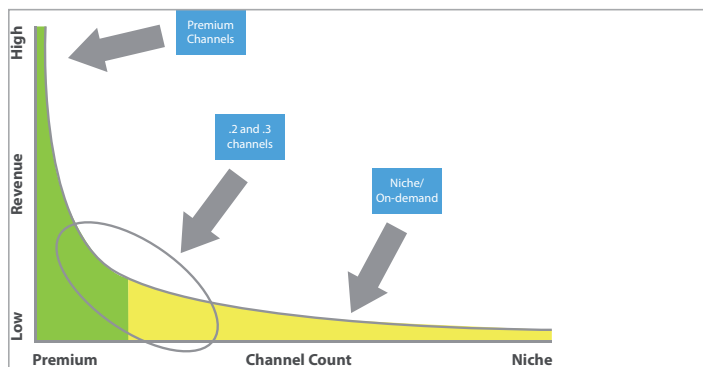
Set against this is the on-going drive towards cost reduction and increased efficiency and many engineering, operational and management personnel in these organizations face herculean challenges.

For **product manufacturers**, the convergence of IT, broadcast and telecoms industries continues at a brisk pace. The challenges we face as a design, development and sales & marketing organization is to be able to select the appropriate technologies that ensure we can design and deliver innovative and cost effective solutions that satisfy our customers' requirements.

The use of commodity IT components is now widespread in broadcast products: the skill is to ensure that it is still possible to deliver products that satisfy the exacting demands of the broadcast industry.

The requirement to develop repurposing tools is also key to the success of the multi-screen world, as the generation or supply of on demand content has to be an automatic process, there is no room for manual intervention or operation.... It is just too costly.

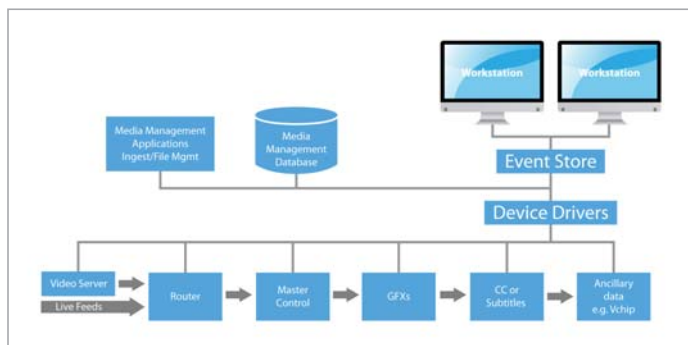
Balancing the books: what value has your channel?



Channel value

Channel value or revenue per channel type is often represented as indicated in this graph. On the left we have the revenue per channel showing high revenue for premium channels, the green segment. The further down the curve we go, the less revenue there is due to less viewers until we get to the yellow section which is very often extremely niche content

The initial target for the subject of this paper is the oval section but it is not prescriptive and can be used in a wider sense.



Channel layout using traditional architecture

Within a traditional playout system under automation control there are various elements within the traffic scheduling, database and automation control layer which operate within the IT environment.

Beneath the horizontal line we have all of the individual hardware elements required which are controlled by the automation layer - comprising storage, servers, routing, master control mixers, graphics engines, closed captions, V-chip, ratings watermarking, etc. Usually these are chosen from "best of breed" components from individual manufacturers.

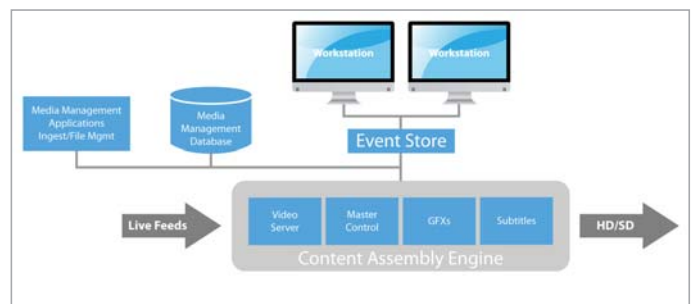
Essentially there are no faults with this approach - it works and selected best of breed components deliver both operationally and technically. But it is expensive: designing, specifying, selecting, procuring, installing and commissioning all of these individual hardware components consumes time, money and resources.

It can probably be justified for premium and tier 1 channels, but what about the others? Also, what if the business model or operation changes? Is it easy to re-deploy these assets in an effective manner and still use them efficiently within your organization?

Making the most of the digital dividend and putting up .2 or even .3 channels is also a demanding task. In addition, to exploit the "Long Tail" for maximum effect requires extremely low incremental channel costs compared to existing discrete solutions.

Content Assembly Engine: a flexible and cost-effective solution to today's media challenge

The solution is to rationalise all of the discrete best of breed components and try and replicate the feature set and functionality in a convenient package.



The content assembly engine

Introducing the content assembly engine, essentially a complete "air chain" in a compact frame, more widely and commercial known as "Channel in a Box".

The benefits of this approach can be summarized as:

- Simple architecture
- Compact form factor
- Low power consumption
- Easy to install
- Good green credentials
- One stop provider
- Simple to connect, set up and configure
- Low channel cost

In fact it has many advantages over a traditional discrete solution. By replicating the discrete solution in a convenient package, it is able to offer all of the functionality required from a content assembly engine or an “air chain”, including :-

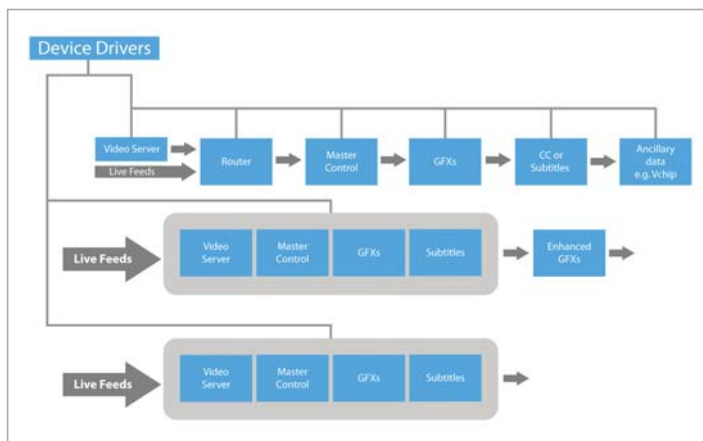
- Storage
- Video, audio and text players
- Live inputs
- Video mixer, keyer
- Routing
- Graphics engine and CG
- Up and down scaling
- Voice-overs
- DVE
- Closed captions
- Bug generator

Whilst this is a comprehensive offering, not all of these features will be required by all channel types. In addition, not all Channel in a Box solutions are able to offer all of this functionality.

Its role is to replicate all of the functionality required in what is generally termed Master Control Operations by virtue of the feature set we have just seen.

It has to be able to work with tapes, files and live feeds, integrate with network and local operations. It should offer up and down conversion to ensure there is a migration path for legacy content. In addition there are likely requirements to integrate with archive and MAM systems as well as remote Disaster Recovery or Business Continuity sites, and potential spoke sites in a hub and spoke centralcast architecture.

Also, it must support EAS, ratings watermarking and 5.1 surround sound, as well as a diversity of HANC and VANC data that either has to be modified or passed through untouched.



Mixed architecture

Mixed architecture is desirable and should be available, in this example of a multi-channel installation at the top we have a premium channel using discrete best of breed equipment, underneath that supporting .2 and / or .3 channels we have Channel in a Box solutions. The first one being augmented with an advance graphics engine for hybrid operation and the last one being entirely stand alone. All this equipment is controlled by the same automation system.

Choice of platform - a critical consideration for your business

Today, there are numerous solutions being offered with feature sets and suitability for different applications that vary widely. It is critical that before making a decision, you first understand the scope and limitations of each system configuration.

1. Existing video server / player with a simple clip player – not considered Channel in a Box and really only of use for simple jukebox type payout.
2. Existing video server / player with simple enhanced functionality (graphics) – goes some way towards Channel in a Box concept - can be placed under full automation control but usually expensive with limited feature set.
3. Pure IT platform based on off-the-shelf IT hardware with broadcast quality I/O hardware and features implemented by CPU cycles – first entry into what can be termed Channel in a Box. It is an attractive proposition but the use of CPU cycles can cause problems. In the post production industry, where commodity and specific IT hardware is found, the use of CPU cycles to complete an edit dissolve or render a graphics sequence is fine as the IT mantra of “as soon as I can” is acceptable. However, playout delivery is a real time process, every frame, every second, every minute, every hour, 24/7, 365 days. In this scenario “as soon as I can” is not acceptable.
4. Hybrid IT platform based on commodity IT hardware with dedicated hardware usually consisting of FPGA array and compositing / mixing card. This is an ideal platform as it offers the benefits of using commodity IT but offers real performance by virtue of the deterministic delivery of the processing hardware.

Above all of these choices of hardware platform, sits the automation layer. Whilst it is inappropriate here to detail requirements for an automation system, it is worth noting the following key criteria:-

1. Absolute maximum reliability and resilience.
2. Maximum flexibility in the architecture to accommodate local, regional programming, opt outs, opt ins including different time zones, etc.
3. Maximum flexibility in taking manual or live control of the system for either operational or technical reasons. The automation system should assist, rather than fight manual intervention. One of the most important features of an automation system is its ability to be operated manually.

Also, you need to ask a number of fundamental questions when making the selection:

- Does it support my video and graphics formats?
- Does it support my file wrappers?
- Does it give me the resilient architecture I require?
- Does it give me the network operational flexibility?
- Does it deliver the feature set I want?
- How does it integrate with the automation?
- Am I restricted by the feature set implemented by the supplier?

Channel in a Box is a fast, efficient and affordable way of adding an extra channel to your business operations, but what happens when the scale of capacity expansion stretches beyond an extra channel – can your Channel in a Box system become a Station in a Box where you add numerous extra channels simultaneously?

If you already have a Channel in a Box based system and want to keep this approach as your business grows there are a number of questions to ask including:

- Can I use it to ingest my content?
- Can it be integrated with third party product?
- How do I become a Station in a Box?
- How does it scale?
- Can I increase its capabilities?
- Can I add channels easily?
- Can I move to HD quickly?
- Can I redeploy it in my organization?

Specifying, installing and supporting these types of solutions can also pose its own set of problems. How easy is it to specify the configuration and options that you require? Does the system come as a turnkey solution, can you do this direct with the manufacturer, is it a dealer or someone who adds their own value by being a Systems Integrator or a Value Added Reseller?

At the installation stage you will ideally want a complete turnkey installation but what if it is not? Do you have to purchase from separate sources, what about IT hardware, do you free issue, who installs and configures the OS, where does the dBase come from, is there any third party hardware to install and set up?

Where does the support fulfilment lie, many software support contracts are second line only, which means you have to determine and confirm it is not a network / hardware issue before the manufactures will accept responsibility. What about ongoing licensing costs - who is going to administer and have you budgeted for them?

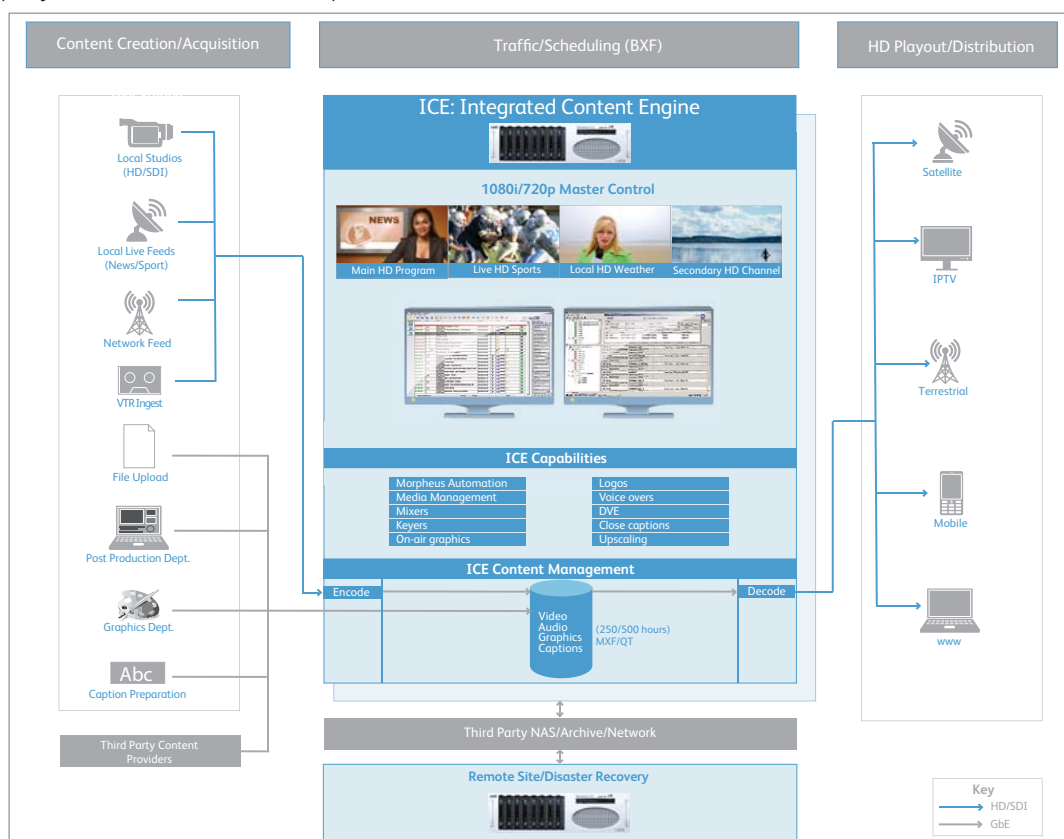
If you enter the IT arena you have to play by the IT rules. The onward march of IT commoditisation and pace of change is an unstoppable machine. Products have built-in obsolesce and the technology becomes disposable due to short product lifecycles and technology refresh.

It will be interesting to see how broadcasters who are used to a dedicated, almost bespoke product that is amortized over typically a 5-10 year period will adapt to the new set of rules?

Channel in a box: capabilities and applications

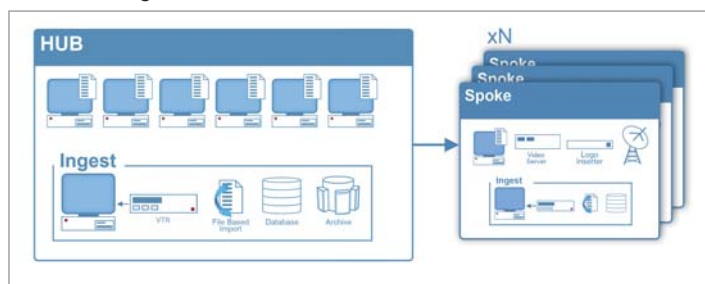
This is a summary diagram of the capabilities and features of a typical Channel in a Box solution. One of its core properties is its versatility, many new applications are being realised as a result of possible deployment discussions with customers but amongst its applications are:

- Standalone channel payout
- Expansion to a larger multi-channel automation system
- Back up to an existing channel (guard either as n+n or n+1)
- Spoke of centralcast Hub and Spoke model
- Ingest, QC preview channel
- Cable head end delivery / commercial insertion
- Cost effective regional opt-out management
- Remote disaster recover / business continuity suite
- Delivery to new platforms – OMVC



Channel in a box: caabilities and applications

One ideal implementation is for use at the Spoke of a Hub and Spoke CentralCasting model.



CentralCasting with hub and spoke

Successful implementation of Hub and Spoke architecture requires centralised (Hub) processing and hardware such as ingest, QC, archive storage and tape handling libraries where they can be utilised most efficiently.

Conclusions

In conclusion we have looked at the converging technologies and the diverging requirements put on content delivery. We have acknowledged the desired drive to improve operational costs and efficiencies within content delivery platforms for both conventional and new channel types and platforms.

There are now real world products on the market that enable Integrated Platform/s for Content Assembly and Distribution. These "Channel in a Box" solutions offer a wide range of capabilities that are fully capable of replacing conventional Master Control operations simply and cost effectively.

Case studies show a cost reduction of around 70% compared to traditional best of breed discrete installations. In addition they offer a rich feature set as well as offering migration strategies and future proof operation.