

MEDIA PROCESSING: TOTAL COST OF OWNERSHIP

On Premise vs. Cloud Based Encoding Workflows

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INTRO

Key market drivers have allowed large production media workflows to move off customer premise to cloud media processing providers. The efficiencies of cloud media processing, namely scalability, utility pricing and managed software have been acknowledged for some time. Customers understand that transcode-as-a-service providers deliver a critical benefit of “future proofing” media processing investments by keeping pace with the rapidly changing video technology market. However, it is a common misconception that cloud media processing is always more expensive than maintaining an on-premise encoding farm at scale. Encoding.com has partnered with Nucleus Research to build a custom total cost of ownership calculator. This helps organizations account and reconcile the capital and operating expenditures that are required to maintain an on-premise encoding farm. Within this white paper we have used real customer scenarios to compare three common on-premise encoding configurations with cloud encoding projections. The calculator that drives these case studies is available for anyone interested.

BACKGROUND

Total cost of ownership (TCO) is a metric frequently used by companies when they evaluate technology. TCO is the total cost of owning a particular item over some time horizon and includes both the acquisition costs and the maintenance costs. In some cases this total is averaged over a three or five year period to get a comparable estimate of ongoing expenses. TCO has a number of strengths as a metric and is important to calculate when evaluating technology, but it also has a number of weaknesses that need to be understood if management is to properly use TCO results. Unfortunately, too many companies rely on the total cost of ownership as the sole metric when making a decision.

Nucleus Research, a global provider of investigative, case-based technology research and advisory services that provide real-world insight into maximizing technology value, recommends calculating TCO over at least a three-year period to get a full understanding of the ongoing costs associated with an application. Costs include initial acquisition costs of software and hardware along with support and consulting costs in the pre-start period. Costs in later years include maintenance and upgrades along with user training and ongoing IT support. The yearly TCO figure is an excellent indicator of the ongoing costs and is best used as a projection for budgeting purposes. Averaging the TCO over the time horizon provides a reasonable metric for comparing similar applications. One note of caution with average TCO is that it does not provide insight into the timing of the costs. A product with low acquisition costs and high maintenance is likely to be less attractive than one with higher acquisition and lower ongoing costs but may have a similar TCO over the period analyzed.

MARKET DRIVERS OF CLOUD MEDIA PROCESSING ADOPTION BY GREGGORY HEIL, ENCODING.COM FOUNDER/CEO

The first generation of cloud video encoding providers hit the market in 2008. The providers available had limited feature sets and supported a limited number of workflows based on open source encoding engines and served primarily short form content. As cloud video encoding platforms matured, large media and entertainment companies offloaded small workflows to cloud video encoding providers, but the majority of their processing volume remained on-premise. Today, pure cloud video providers have achieved feature parity with on-premise enterprise software and appliance providers, and major production workflows are now running within pure cloud environments.

Several advancements in cloud media processing platforms have enabled the production workflows to make functional as well as financial sense:

Adoption of Cloud Storage by M&E companies - As large media and entertainment companies migrated to cloud storage platforms, media processing on cloud compute resources located within the same data centers as the source media has garnered huge economic, speed, and workflow efficiencies.

Security - Initial concerns were raised around security of storing and processing high value content within public cloud facilities. Recent MPAA certifications from top cloud providers significantly mitigate some of these security concerns.

Mature Web Service APIs - Mature, fast, scalable, and well-documented APIs allow customers to automate cloud based encoding workflows by integrating them into sophisticated legacy applications, workflows or media management systems. Third-Party integrations with MAM and OVPs like Aspera/ IBM Orchestrator, Levels Beyond, the Platform, etc. allow the migration of production workflows to the cloud without any development resources.

Transfer Acceleration Technologies - Cloud based encoding providers now support UDP Technologies such as Aspera or Signiant, which greatly accelerates the transfer of large media files to and from cloud processing centers and ensures a high degree of point-to-point security.

Format Support - While the first generation of cloud encoding providers ran open source encoding engines capable of simple encoding tasks, today's providers are maintaining advanced commercial encoding engines capable of high quality output, complex encoding tasks, and the complete range of broadcast and edit codecs.

Cloud Price Competition - The underlying cost of goods sold of cloud encoding providers is cloud storage, compute, and bandwidth. With aggressive entry into the cloud compute and storage space by Rackspace, IBM, Google, and AWS, significant economies of scale and cost competition make cloud processing and storage models more attractive.

Launch of Hybrid Cloud Models - Some encoding providers have launched hybrid cloud models which allow existing on-premise compute and storage resources to be utilized with the advantage of managed software and automated overflow to public cloud resources.

COMPARE

USE CASE #1

USE CASE #1

CURRENT ENCODING WORKFLOW

Open source encoding software on general purpose hardware

TOP ENCODING CHALLENGE

Maintenance overhead of open source software

SOURCE CONTENT

Short form, heterogeneous formats and codecs, SD and HD

5 ENCODING SERVERS

\$ 17000 COST PER SERVER

15 % GROWTH RATE

6000 ASSETS PER MONTH

15 AVERAGE DURATION/MINS

20 AVERAGE BITRATE

3 (2 X MP4S AND FLV) TARGET OUTPUTS

COMPARE

USE CASE #1

OPEN SOURCE
5 nodes

Open Source Encoding Software on General Purpose Hardware

6000
ASSETS PER MONTH

15
AVG DURATION/MINS

20
MB/S

3
TARGET OUTPUTS

CURRENT SOLUTION COST

Evaluation of the cost of maintaining your current encoding solution.

Projected growth rate

The percentage estimated encoding demands will increase annually **15%**

Hardware

The number of servers currently maintained for encoding demands **5**

The average cost to purchase a new server **\$17,000 per server**

The average annual cost to maintain a single server **\$4,000 per server**

Software

Encoding software currently used **Open Source**

The average license cost per server **0 per server**

Average maintenance cost per server **\$3,000 per server**

Storage

GB purchased each year **120 GB per year**

The amount of storage currently maintained **1,000 GB**

The annual cost per GB to purchase storage **\$20 per GB**

The annual cost to maintain disaster recovery and failover for on premise rather than cloud storage **0**

Personnel

The number of hours IT spends each month on maintenance and upgrades **100 hours**

The number of hours IT spends each month on capacity planning and development **50 hours**

The average annual fully loaded cost of an IT employee **\$60,000**

The number of hours estimated are lost each month by end users due to encoding delays **50 hours**

The average annual fully loaded cost of an end user employee **\$70,000**

COMPARE

USE CASE #1



Open Source Encoding Software on General Purpose Hardware

6000
ASSETS PER MONTH

15
AVG DURATION/MINS

20
MB/S

3
TARGET OUTPUTS

ENCODING.COM SOLUTION COST

The anticipated costs for the initial consulting and ongoing fees associated with the Encoding.com solution.

Cloud Solution

Input

The number of files processed each month **6,000 files**

The average duration of one of these files **15 minutes**

The average bitrate for one of these files (mb/s) **20 mb/s**

Output

The number of outputs required per source **3 outputs**

The average bitrate for one of these output files (mb/s) **5 mb/s**

Estimated GB processed per month **13,502 GB/mo**

The monthly per GB cost for the Encoding.com cloud solution **\$1.00 per GB/mo**

Estimated annual cost for Encoding.com cloud solution **\$162,020**

The expected annual increase in cost **4%**

ANALYZE

USE CASE #1



Open Source Encoding Software on General Purpose Hardware

6000
ASSETS PER MONTH

15
AVG DURATION/MINS

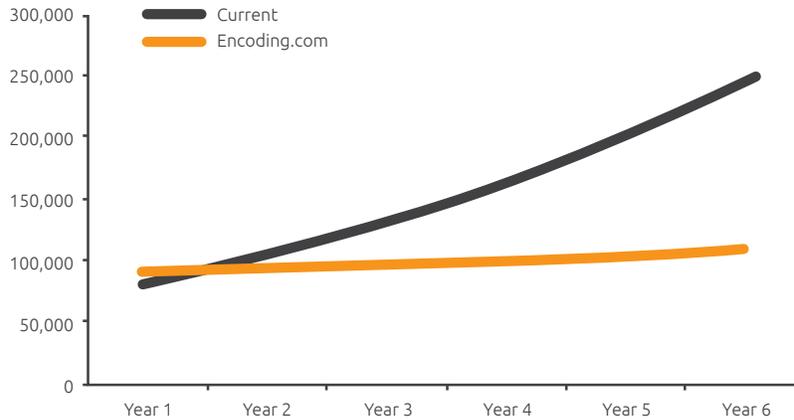
20
MB/S

3
TARGET OUTPUTS

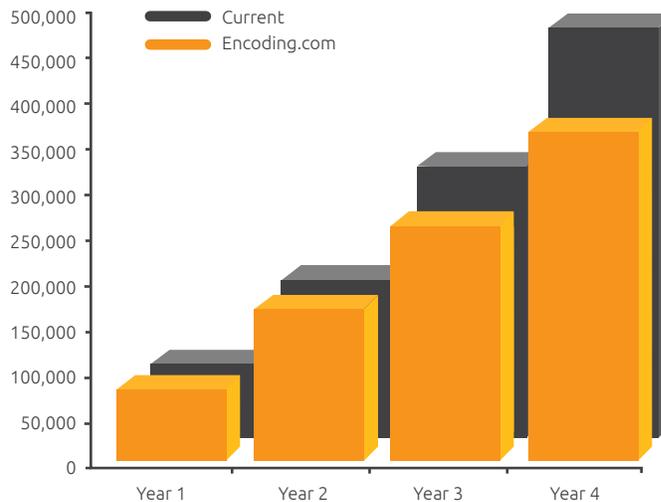
FINANCIAL RESULTS - CLOUD SOLUTION

Current after tax three-year total cost **\$479,668**
 Encoding.com after tax three-year total cost input **\$378,407**

ANNUAL COST



CUMULATIVE COST



TOTAL SAVINGS

21%
ENCODING.COM SAVINGS
IN 4 YEARS

FINANCIAL RESULTS

Current	Year 1	Year 2	Year 3	Year 4
CAPEX	12,750	27,413	44,274	63,666
OPEX	125,583	144,420	166,083	190,996
After tax cash flows	80,673	104,376	131,635	162,983
Encoding.com	Year 1	Year 2	Year 3	Year 4
CAPEX	0	0	0	0
OPEX	162,020	168,501	175,241	182,251
After tax cash flows	89,111	92,676	96,383	100,238

Assumed tax rate: 45%

COMPARE

USE CASE #2

USE CASE #2

CURRENT ENCODING WORKFLOW

Enterprise encoding software on general purpose hardware

TOP ENCODING CHALLENGE

Long encoding queues at peak times

SOURCE CONTENT

Episodic TV content in JPEG2000

14 ENCODING SERVERS

\$ 20000 COST PER SERVER

15 % GROWTH RATE

1550 ASSETS PER MONTH

45 AVERAGE DURATION/MINS

30 AVERAGE BITRATE

9 (6 X MP4S, WEBM AND 8 BITRATE HLS) TARGET OUTPUTS

COMPARE

USE CASE #2

ENTERPRISE SOFTWARE
14 nodes

Enterprise Encoding Software on General Purpose Hardware

1550
ASSETS PER MONTH

45
AVG DURATION/MINS

30
MB/S

9
TARGET OUTPUTS

CURRENT SOLUTION COST

Evaluation of the cost of maintaining your current encoding solution.

Projected growth rate

The percentage estimated encoding demands will increase annually **15%**

Hardware

The number of servers currently maintained for encoding demands **14**

The average cost to purchase a new server **\$20,000 per server**

The average annual cost to maintain a single server **\$4,000 per server**

Software

Encoding software currently used **Commercial Software**

The average license cost per server **\$8,000 per server**

Average maintenance cost per server **\$4,000 per server**

Storage

GB purchased each year **300 GB per year**

The amount of storage currently maintained **4,000 GB**

The annual cost per GB to purchase storage **\$25 per GB**

The annual cost to maintain disaster recovery and failover for on premise rather than cloud storage **\$0**

Personnel

The number of hours IT spends each month on maintenance and upgrades **100 hours**

The number of hours IT spends each month on capacity planning and development **100 hours**

The average annual fully loaded cost of an IT employee **\$60,000**

The number of hours estimated are lost each month by end users due to encoding delays **150 hours**

The average annual fully loaded cost of an end user employee **\$70,000**

COMPARE

USE CASE #2



ENTERPRISE SOFTWARE
14 nodes

Enterprise Encoding Software on General Purpose Hardware

1550

ASSETS PER MONTH

45

AVG DURATION/MINS

30

MB/S

9

TARGET OUTPUTS

ENCODING.COM SOLUTION COST

The anticipated costs for the initial consulting and ongoing fees associated with the Encoding.com solution.

Cloud Solution

Input

The number of files processed each month **1,550 files**

The average duration of one of these files **45 minutes**

The average bitrate for one of these files (mb/s) **50 mb/s**

Output

The number of outputs required per source **9 outputs**

The average bitrate for one of these output files (mb/s) **5 mb/s**

Estimated GB processed per month **26,171 GB/mo**

The monthly per GB cost for the Encoding.com cloud solution **\$0.80 per GB/mo**

Estimated annual cost for Encoding.com cloud solution **\$251,246**

The expected annual increase in cost **15%**

ANALYZE

USE CASE #2

ENTERPRISE SOFTWARE

14 nodes

Enterprise Encoding Software on General Purpose Hardware

1550
ASSETS PER MONTH

45
AVG DURATION/MINS

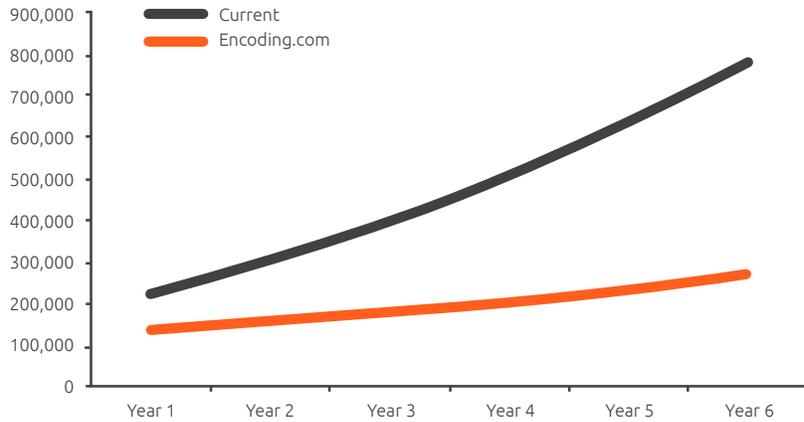
30
MB/S

9
TARGET OUTPUTS

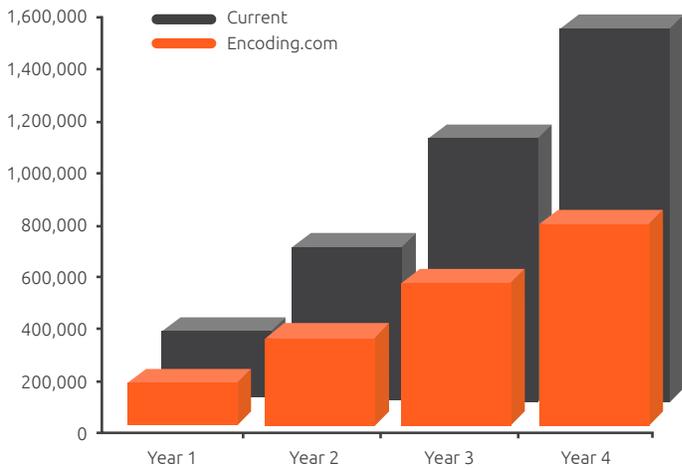
FINANCIAL RESULTS - CLOUD SOLUTION

Current after tax four-year total cost **\$1,405,843**
 Encoding.com after tax four-year total cost input **\$690,010**

ANNUAL COST



CUMULATIVE COST



TOTAL SAVINGS

51%
ENCODING.COM SAVINGS
IN 4 YEARS

FINANCIAL RESULTS

Current	Year 1	Year 2	Year 3	Year 4
CAPEX	58,800	126,420	204,183	293,610
OPEX	285,579	328,416	377,678	434,330
After tax cash flows	210,576	295,671	393,529	506,067
Encoding.com	Year 1	Year 2	Year 3	Year 4
CAPEX	0	0	0	0
OPEX	251,246	288,933	332,273	382,113
After tax cash flows	138,185	158,913	182,750	210,162

Assumed tax rate: 45%

USE CASE #3

CURRENT ENCODING WORKFLOW

Enterprise encoding appliances

TOP ENCODING CHALLENGE

Long feature release cycles of hardware-based encoders

SOURCE CONTENT

Long form motion pictures RED, Prores 4444, Motion JPEG

31 ENCODING SERVERS

\$ 30000 COST PER SERVER

15 % GROWTH RATE

6000 ASSETS PER MONTH

90 AVERAGE DURATION/MINS

50 AVERAGE BITRATE

12 (6 X MP4S, WEBM AND 8 BITRATE HLS WIDEVINE DRM)
TARGET OUTPUTS

COMPARE

USE CASE #3

HARDWARE APPLIANCE
31 nodes

Enterprise Encoding Appliances

6000
ASSETS PER MONTH

90
AVG DURATION/MINS

50
MB/S

12
TARGET OUTPUTS

CURRENT SOLUTION COST

Evaluation of the cost of maintaining your current encoding solution.

Projected growth rate

The percentage estimated encoding demands will increase annually **15%**

Hardware

The number of servers currently maintained for encoding demands **31**

The average cost to purchase a new server **\$20,000 per server**

The average annual cost to maintain a single server **\$4,000 per server**

Software

Encoding software currently used **Hardware Appliance**

The average license cost per server **\$10,000 per server**

Average maintenance cost per server **\$3,000 per server**

Storage

GB purchased each year **2,000 GB per year**

The amount of storage currently maintained **200,000 GB**

The annual cost per GB to purchase storage **\$20 per GB**

The annual cost to maintain disaster recovery and failover for on premise rather than cloud storage **\$150,000**

Personnel

The number of hours IT spends each month on maintenance and upgrades **150 hours**

The number of hours IT spends each month on capacity planning and development **150 hours**

The average annual fully loaded cost of an IT employee **\$80,000**

The number of hours estimated are lost each month by end users due to encoding delays **150 hours**

The average annual fully loaded cost of an end user employee **\$70,000**

COMPARE

USE CASE #3



HARDWARE APPLIANCE
31 nodes

Enterprise Encoding Appliances

6000

ASSETS PER MONTH

90

AVG DURATION/MINS

50

MB/S

12

TARGET OUTPUTS

ENCODING.COM SOLUTION COST

The anticipated costs for the initial consulting and ongoing fees associated with the Encoding.com solution.

Cloud Solution

Input

The number of files processed each month **6,000 files**

The average duration of one of these files **90 minutes**

The average bitrate for one of these files (mb/s) **50 mb/s**

Output

The number of outputs required per source **12 outputs**

The average bitrate for one of these output files (mb/s) **4 mb/s**

Estimated GB processed per month **202,532 GB/mo**

The monthly per GB cost for the Encoding.com cloud solution **\$0.35 per GB/mo**

Estimated annual cost for Encoding.com cloud solution **\$850,636**

The expected annual increase in cost **15%**

ANALYZE

USE CASE #3

HARDWARE APPLIANCE

31 nodes

Enterprise Encoding Appliances

6000

ASSETS PER MONTH

90

AVG DURATION/MINS

50

MB/S

12

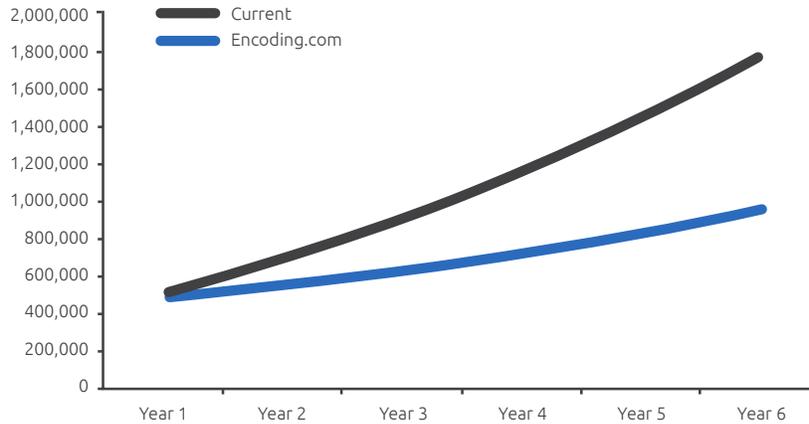
TARGET OUTPUTS

FINANCIAL RESULTS - CLOUD SOLUTION

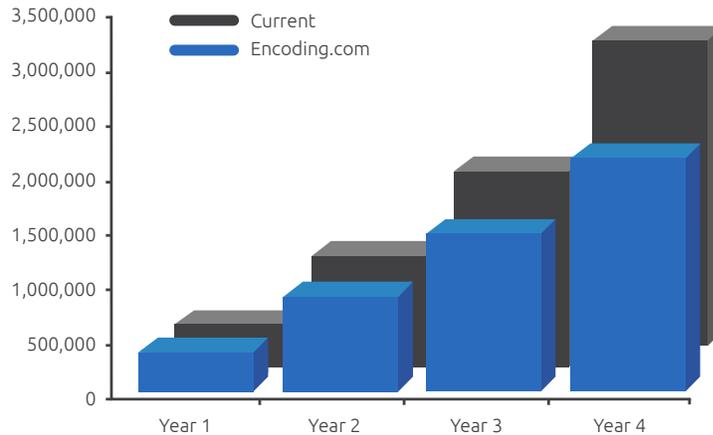
Current after tax three-year total cost **\$3,228,410**

Encoding.com after tax three-year total cost input **\$2,336,150**

ANNUAL COST



CUMULATIVE COST



TOTAL SAVINGS

28%
 ENCODING.COM SAVINGS
 IN 4 YEARS

FINANCIAL RESULTS

Current	Year 1	Year 2	Year 3	Year 4
CAPEX	139,500	299,925	484,414	696,576
OPEX	668,444	746,211	835,642	938,489
After tax cash flows	494,589	683,348	900,420	1,150,053
Encoding.com	Year 1	Year 2	Year 3	Year 4
CAPEX	0	0	0	0
OPEX	850,636	978,231	1,124,966	1,293,711
After tax cash flows	467,850	538,027	618,731	711,541

Assumed tax rate: 45%

CONCLUSION

Through Encoding.com's partnership with Nucleus Research in building a custom TCO calculator we aim to help an organization account and reconcile the capital and operating expenditures that are required to maintain an on-premise encoding farm.

As we continue to see large production media workflows move off customer premise to cloud media processing providers and the efficiencies of cloud media processing become more apparent. Cloud media processing, as is illustrated throughout this white paper, is often the more economical choice, rather than maintaining an on-premise encoding farm at scale. It is our goal for this white paper to showcase real customer scenarios that compare three common on-premise encoding configurations with cloud encoding projections. The calculator that drives these case studies is available for anyone interested in customizing.

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About Nucleus

Nucleus Research is a global provider of investigative, case-based technology research and advisory services that provide real-world insight into maximizing technology value. For more information, visit NucleusResearch.com.

Nucleus Research is registered with the National Association of State Boards of Accountancy. Registration number: 108024

About Encoding.com

Encoding.com, the world's largest video encoding service and provider of Vid.ly, the groundbreaking universal video URL platform, powers video for thousands of leading brands across Advertising, Media and Entertainment, eLearning, Retail, Telecommunications and Lifestyle. Encoding.com's cloud video platform enables organizations to instantly scale support for all popular web and mobile formats and utilize Encoding Intelligence™ to accelerate processing while eliminating expensive video infrastructure investments. With over 20 million encodes under its belt, Encoding.com is the only encoding service to offer service level guarantees for performance so that you can focus on what you do best.

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