

# Linius Technologies Ltd.

## The Holy Grail of TV broadcasts ... personal ads

Linius Technologies Ltd. (LNU) has developed a patented technology that enables video files to be played out on any device from anywhere on the internet without the need for content providers to store hundreds of different copies with different subtitles, languages and advertisements, or in many different file formats. Instead, LNU's so-called video virtualization technology allows for subtitles, audio tracks, ads etc., to be added to the video stream on the fly, i.e. as the video is being played.

The implications of this different approach are very far reaching. Firstly, content providers will be able to achieve substantial cost savings in the areas of transcoding and storage. Imagine Netflix not having to transcode and store 300 different versions of each movie on servers around the globe anymore. This frees up very substantial storage capacity and Internet bandwidth allowing for major cost savings, up to 80%.

### Personalized ads in TV broadcasts is game-changing

More importantly, LNU's technology enables content providers, such as Foxtel, to personalize the consumption of media content at the level of the individual viewer, i.e. based on known preferences regarding sports, music, cars etc as well as personal information, such as age and gender. Media companies will be able to serve up personalized ads or suggest certain content, similar to how ads on the Internet are served up. This feature will increase the value of advertising time on TV and in streaming media nearly threefold, providing a major revenue opportunity throughout the media sector. TMT Analytics believes this feature has the potential to revolutionize business models in TV broadcasting and OTT streaming media.

LNU aims to roll out commercial products late in 2016 or early 2017, initially targeting the low hanging fruit in the video processing sector, i.e. Transcoding, Content Delivery Networks and personalized ads.

### Starting coverage with BUY rating

LNU is in the process of finalizing its pricing structure and sales model, which may alter the revenue, margin and growth assumptions in our financial model for LNU, and thus the assumptions underlying our DCF valuation. Therefore, we consider our DCF-derived valuation of A\$0.28 a fair value rather than price target at this stage. However, considering the substantial potential share price upside to this fair value, assuming successful monetization of the video virtualization technology, we initiate our research coverage of LNU with a Buy recommendation.

LNU.ASX		A\$ M	FY16E	FY17E	FY18E	FY19E
Number of shares (m)	5622	Revenues	0	5.6	14.6	25.5
Number of shares FD (m)	738.2	EBITDA	-2.0	0.1	4.3	10.0
Market capitalisation (A\$ m)	34.9	NPAT	-1.9	-0.2	2.8	6.7
Market cap fully dil (A\$ m)	45.8	EPS FD	-0.003	0.00	0.004	0.01
12 month high/low A\$	0,094 / 0,055	EV/EBITDA	N/A	N/M	7.3	2.6
Average daily volume (k)	1,080	EV/Sales	N/A	6.0	2.2	1.0

Readers should be aware that TMT Analytics has been engaged by the company covered in this report for ongoing research coverage. Please refer to the final page of this report for the General Advice Warning, disclaimer and full disclosures.

## LNU.ASX

Software & IT Services

Australia

Risk: High

On 9 May 2016 LNU relisted on the ASX following an RTO of FIE and raised A\$3.5M at A\$0.05 per share.

LNU provides a patented enterprise grade software technology that virtualizes video files. The process reduces the time required for content preparation and processing (ingestion, transcoding, storage etc) and can populate a catalog of thousands of video titles in minutes as opposed to months without the need for costly, large-scale hardware systems. Furthermore, it enables personalized advertising in TV broadcasting.

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## BUY

Current price: A\$ 0.062

27 June 2016

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**LNU.ASX** FY-end June

Profit & Loss account	2016E	2017E	2018E	2019E
Revenues	0.0	5.6	14.6	25.5
EBITDA	-2.0	0.1	4.3	10.0
EBITDA %	N/A	1.0%	29.5%	39.0%
Depreciation & Amortisation	0.0	-0.3	-0.3	-0.3
EBIT	-2.0	-0.2	4.0	9.6
EBIT %	N/A	-3.8%	27.5%	37.8%
Interest income & expense net	0.0	0.1	0.0	0.1
Other items	0.0	0.0	0.0	0.0
<b>Profit before Tax</b>	<b>-1.9</b>	<b>-0.2</b>	<b>4.1</b>	<b>9.7</b>
Taxes	0.0	0.0	-1.3	-3.0
<b>Net earnings</b>	<b>-1.9</b>	<b>-0.2</b>	<b>2.8</b>	<b>6.7</b>
Ordinary shares outstanding	562.2	562.2	562.2	562.2
Fully diluted # shares	738.2	738.2	738.2	738.2
<b>Earnings per share</b>	<b>-0.003</b>	<b>0.00</b>	<b>0.005</b>	<b>0.012</b>
Earnings per share fully diluted	-0.003	0.00	0.004	0.009

Cash Flow Statement	2016E	2017E	2018E	2019E
Net income P&L	-1.9	-0.2	2.8	6.7
Depreciation & amortisation	0.0	0.3	0.3	0.3
Impairments	0	0	0	0
Change in working capital	0.0	-0.5	-0.8	-1.0
Other items	0	0	0	0
<b>Cash flow from operations</b>	<b>-1.9</b>	<b>-0.4</b>	<b>2.2</b>	<b>6.1</b>
<b>Net cash flow from investments</b>	<b>-5.2</b>	<b>-0.3</b>	<b>-0.4</b>	<b>-0.6</b>
Dividend paid	0	0	0	0
Change in equity	8.5	0	0	0
Change in debt	0	0.0	0	0
Other items	0	0	0	0
<b>Cash flow from financing</b>	<b>8.5</b>	<b>0.0</b>	<b>0</b>	<b>0</b>
<b>Net cash flow</b>	<b>1.4</b>	<b>-0.7</b>	<b>1.8</b>	<b>5.5</b>

Balance Sheet	2016E	2017E	2018E	2019E
<b>Current assets</b>				
Cash and marketable securities	2.1	1.3	3.2	8.6
Accounts receivable	0.0	0.9	2.4	4.2
Inventories	0.0	0.0	0.0	0.0
Other current assets	0.0	0.6	1.5	2.6
<b>Total current assets</b>	<b>2.1</b>	<b>2.8</b>	<b>7.0</b>	<b>15.4</b>
<b>Fixed assets</b>				
Net property, plant & equipment	0.2	0.5	0.8	1.3
Goodwill	5	4.8	4.5	4.3
Other intangible assets	0	0	0	0
Other assets	0	0	0	0
<b>Total fixed assets</b>	<b>5.2</b>	<b>5.2</b>	<b>5.3</b>	<b>5.6</b>
<b>Total assets</b>	<b>7.3</b>	<b>8.0</b>	<b>12.4</b>	<b>21.0</b>
<b>Current liabilities</b>				
Short-term debt	0	0	0	0
Accounts payable	0.02	0	0.5	1.2
Dividends payable	0	0	0	0
Other current liabilities	0	0	0.5	1.3
<b>Total current liabilities</b>	<b>0</b>	<b>1.0</b>	<b>2.5</b>	<b>4.4</b>
Long-term debt	0	0.0	0.0	0.0
Total provisions	0	0.0	0.0	0.0
<b>Total group equity</b>	<b>7.3</b>	<b>7.1</b>	<b>9.9</b>	<b>16.6</b>
<b>Total liabilities and equity</b>	<b>7.3</b>	<b>8.0</b>	<b>12.4</b>	<b>21.0</b>

Valuation	2016E	2017E	2018E	2019E
<b>Relative valuation</b>				
P/E (reported)	N/M	N/M	126	52
P/B	4.8	4.9	35	21
P/CF	N/A	N/A	157	58
Price to sales	N/A	6.2	24	14
EV / sales	N/A	6.0	22	10
EV / EBITDA	N/A	N/M	73	26
Dividend yield	0.0	0.0	0.0	0.0
ROIC / WACC	-2.3	-0.2	23	55

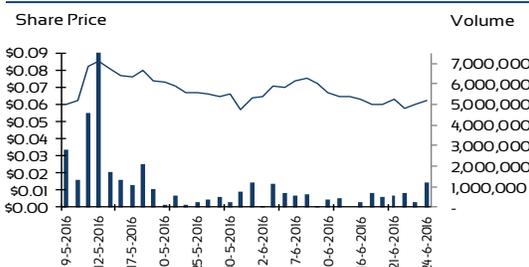
Discounted Cash Flow		
<b>Assumptions</b>		
Long term interest rate		3%
Risk premium		4.3%
Marginal tax rate		30%
Long term growth		3%
Leveraged Beta		1.45
Implied WACC		9.0%

TMT Analytics applied WACC 15% to 20%  
 DCF fair value range per share A\$ 0.28-0.49

Profitability ratios	2016E	2017E	2018E	2019E
Return on Equity	-27%	-3%	28%	41%
Return on Assets	-27%	-2%	22%	32%
Return on Invested Capital	-275%	0%	47%	85%
EBITDA margins	N/A	1.0%	29.5%	39.0%
EBIT margins	N/A	-3.8%	27.5%	37.8%
Net margins	N/A	-3.4%	18.9%	26.4%

Financial Strength	2016E	2017E	2018E	2019E
Net debt	-2.1	-1.3	-3.2	-8.6
Net debt / Equity	-0.3	-0.2	-0.3	-0.5
Net debt / EBITDA	1.1	-24.0	-0.7	-0.9
Interest coverage	N/M	N/M	N/M	N/M

Capital Structure	
Ordinary shares	562.2
Performance shares	100
Options and warrants	76.0
Fully diluted	738.2
Market capitalisation (A\$ m)	34.9
Market cap. fully diluted (A\$ m)	45.8
Free float %	35%
12 month high/low A\$	0.094 / 0.055
Average daily volume (R)	1,080



Source: Factset, TMT Analytics

## Digital video work flow still largely based on its analog roots

Today’s work flow in the digital video industry comprises of roughly eight sequential production steps, from capturing video up to play out on a device, such as a tablet, smart phone, TV or PC. While not entirely the same, the individual production steps do resemble the work flow of a typical analog film or video production of more than thirty years ago, e.g. the footage is shot, edited, subtitled, distributed and played, e.g. on TV.

However, the simple fact that today’s video streams are digital rather than analog means that there are very substantial efficiency gains to be made by approaching video processing in a way that is much more aligned with what video actually is, i.e. digital data rather than analog, sequential, information. We will elaborate on this below, but we will first describe the video processing work flow in use today in order to provide a better understanding of the market opportunity that LNU aims to capture.

### Eight steps from production to consumption of video

#### Video capturing / recording

In this first step video footage is recorded using a digital camera. The raw video is stored in a specific file format, dependent on the camera type or make. Examples of common video file formats include MKV, MXF, VOB, AVI, WMV, MPEG4, MOV and M4V.

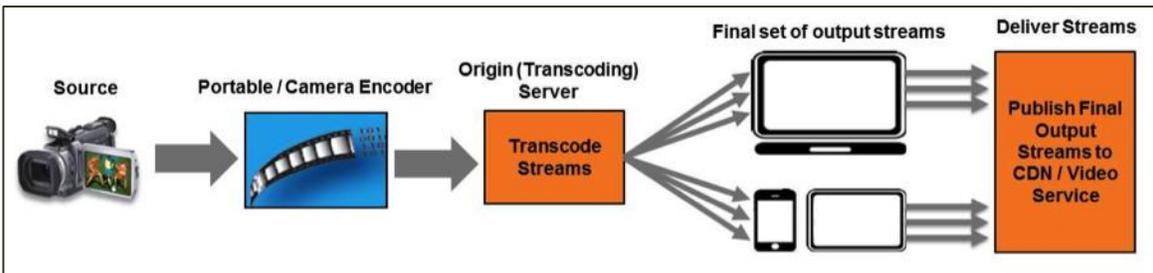
#### Editing / post production

Once the video footage is recorded and stored it can be edited, e.g. put in the proper sequence, scenes can be cut, colors can be adjusted, sound tracks can be added, audio can be enhanced, graphics can be inserted etc. This editing and post production process results in a master file of the video, which forms the basis for all future versions of the particular movie, TV show etc.

#### Transcoding

The master file is just one version of the final video file. Given the many different file formats used by different playback devices, the master file will need to be available in all these different formats. Furthermore, given that viewers in different locations will have varying internet bandwidths, files will need to be available in different video qualities as lower quality will require smaller bandwidth. E.g. an uncompressed standard definition (SD) one-hour video file may take up anywhere between 5GB to 15GB while a high definition (HD) file can take up to 50GB. Naturally, once compressed the file size will be substantially smaller, but a two-hour HD movie file can still be as large as 14GB.

FIGURE 1: VIDEO TRANSCODING WORK FLOW



Source: Wowza, TMT Analytics

The third element of transcoding is the aspect ratio of the display that will be used to play the video, i.e. the proportional relationship between the width and the height of the display. A common aspect ratio for films shown in movie theatres, for instance, is 1.85:1 meaning the width

of the screen is 1.85x its height. The most commonly used aspect ratio for modern day TV programs is 16:9, while many computer screens still have an aspect ratio of 5:4. Mobile phones have their own aspect ratios, depending on the model. Suffice it to say that the many different aspect ratios in use today require video files to be converted to fit all the different display shapes.

In transcoding, these three elements (file format, quality and aspect ratio) are taken into account and a different version of the video is produced for each combination of elements. It will be immediately obvious that transcoding results in a very significant increase in the number of different versions of the original master file, requiring substantially more storage capacity and transmission bandwidth. Assuming the original master file of a 2-hour movie in HD is transcoded into 200 different versions, the original 14GB storage requirement now becomes a 2.8TB (2,800GB) storage requirement.

#### Video storage and hosting

Once video is transcoded, the many different video files need to be stored and hosted. Storage of video files is done in many different locations, either within one country or around the world. E.g. Foxtel will store its programs at different locations in Australia, while Netflix stores its content in many different locations around the world.

The reason to store video in different locations is to make sure viewers have quick access to the content. For instance, if Netflix only stored House of Cards on one of AWS' (Amazon Web Services) data centers in the United States, it would take too much time to stream that content across the internet to a viewer in Australia. Furthermore, if a second viewer in Australia wanted to view the same episode, it would need to be streamed from the US to Australia a second time, eating up internet bandwidth.

Consequently, this type of video content is stored and hosted on many locations around the world, with popular content even being stored locally, e.g. on a street cabinet to serve a specific neighborhood.

So in addition to one video file having many different versions after transcoding, all these different versions are stored on dozens if not hundreds of different locations. The 2.8TB storage requirement mentioned in the earlier example has now become a 560TB storage requirement for just one HD movie assuming it is being stored in 200 different locations.

#### Asset management and workflow

The video files to be played out have certain attributes that need to be added to the video stream at the time of playing, such as subtitles. Additionally, associated trailers, promos and images that are used around the time of play out need to be managed and included in the work flow, for instance at a TV station.

#### Protection and security (Digital Rights Management)

In order to prevent, or at least slow down, piracy, Digital Rights Management (DRM) aims to control access to digital, copyrighted material, such as video. DRM removes usage control from the person in possession of digital content and transfers it to a computer program, typically a media player. The access control technologies used in DRM come in a wide variety, but the underlying principle is the same; restrict or limit the usage of media by setting parameters for its use. For instance, regional codes can prevent movies or games bought in Europe to be played on devices bought in North America. Or software attached to the video file can prevent the user from making more than a certain number of copies.

Applying DRM to video files is the last step before content is sent out across the Internet or a media company's network.

### Delivery of the video through Content Delivery Networks (CDN)

As mentioned earlier, digital media is stored in many different locations and close to the edge of the Internet, i.e. close to the end consumer, in order to limit delays in play out due to bandwidth limitations. Content delivery networks (CDN's) provide a globally distributed network of servers that store content closer to consumers, thus improving access speeds for downloading this content. Large CDN companies include Akamai, Amazon CloudFront, Level 3 Communications and CDNetworks (Figure 2). Additionally, there is a range of global Telecom companies that provide local video storage and hosting capacity.

FIGURE 2: CDNETWORKS' GLOBAL POINTS OF PRESENCE AS A CDN EXAMPLE



Source: CDNetworks, TMT Analytics

In addition to these large datacenters, more granularity is added to the delivery model by distributing popular content even closer to consumers, for instance at the city or suburb level, by storing content in local datacenters and Telco's street cabinets.

Even though data center storage costs per unit have been declining by about 15% to 20% annually over the last several years according to The Data Center Journal (March 2016), storage still adds a significant cost to the overall video distribution model. In 2015 the value of the global CDN market totaled nearly US\$ 5BN in size with an expected annual average growth rate of about 26% through 2020 to total nearly US\$ 16BN by then, according to MarketsandMarkets.

### Play out and broadcasting

The final step from production to viewing is the actual play out of the media, either on-demand or through a regular TV broadcast, on various play back devices, i.e. tablets, smart phones, PC's, TV etc.

The key take-away's from the above are:

- 1) Video files today need many different copies to account for the different file formats used by media players, required quality of the video and aspect ratios of play out devices, requiring a lot of transcoding work.
- 2) Video content that is made nationally or globally available and around the edges of the Internet requires massive amounts of storage capacity.

Both issues result directly from today's video processing work flow and the fact that video content is prepared for most possible combination of play out variables. It's like a restaurant preparing every dish on the menu according to all possible tastes of all potential customers before they even come in.

## Linus approaches video play out as “made-to-order”

The essence of LNU’s made-to-order approach to video play out is that it starts by asking the question which device is actually requesting play out of a particular piece of video content? In keeping with the restaurant analogy above, LNU’s software asks which dish the customer wants, how he wants it cooked, how he wants it seasoned, and at which table the customer is sitting.

All play out variables are known before video is compiled

The video play out variables in this made-to-order approach include the specifics of the play out device, the media player used as well as the version, subtitle language (if any) and the viewer-specific preferences. All these variables are then used to compile the actual video feed to be played out.

## LNU allows viewer-specific ads to be added to video stream

Because of LNU’s made-to-order approach to video play out, the technology enables content providers to include viewer specific advertising to the video stream as well. For instance, based on the personal information a Foxtel subscriber has already given Foxtel at signup and the subscriber’s viewing habits over time as recorded by the Foxtel Set Top Box (STB), Foxtel will be able to work out with a certain level of granularity what sort of advertisements it should serve up to this particular viewer and his or her household at different times during the day. These advertisements would likely be very different from the ads the neighbors get served up based on their viewing habits and personal details.

This is a game-changing feature of LNU’s technology

TV advertising today is still very much based on a one-size-fits-all approach in which people in the same neighborhood, city or even state get to see the same ads at the same time in the same broadcasting stream.

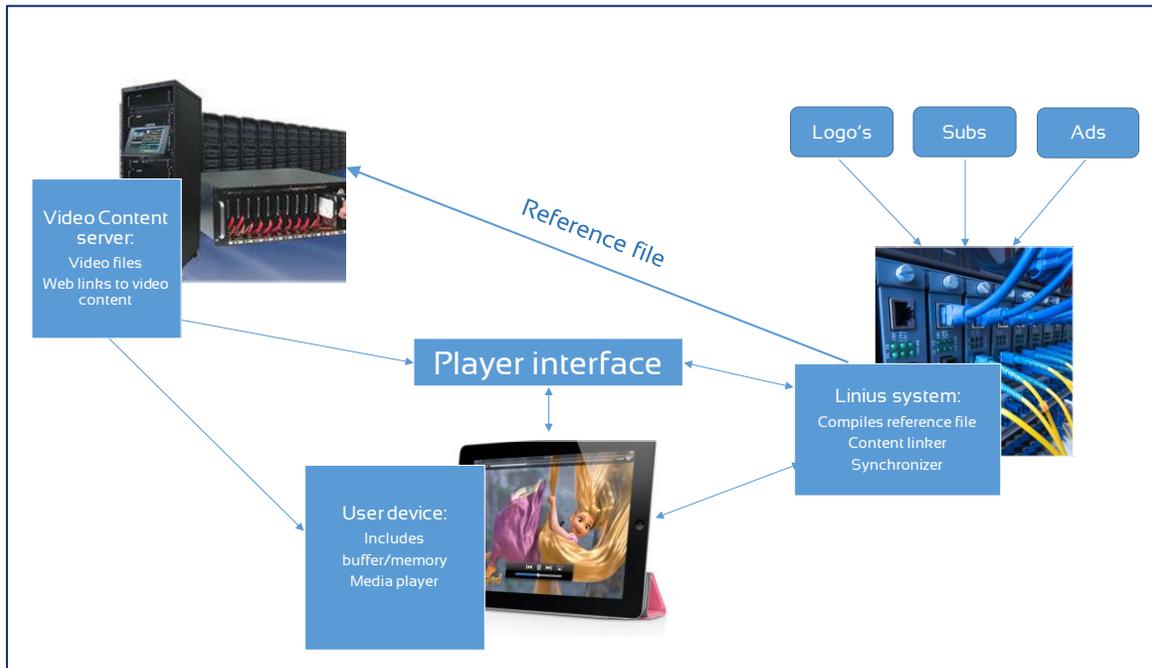
We believe the viewer-specific advertising feature facilitated by LNU’s technology has the potential to become a game-changer in above-the-line advertising as this level of granularity in advertising is only seen in online advertising so far. On average ad space in such a model is nearly three times more valuable to advertisers than generic ad space on TV and therefore presents a substantial revenue opportunity to LNU’s prospective customers, such as broadcasting companies, in our view.

## From Master file to customer specific video

The process to compile a user-specific video stream through LNU’s technology is fairly straightforward. Let’s say a user accesses an on-demand video service over the Internet through his iPad 2 to watch a movie in HD quality. The iPad’s media player contacts the Linus-supported server where a reference file is compiled based on the parameters of the media player on the iPad and the user’s preferences. For instance, the media player may be QuickTime version 7.7.9 and the user may want to view the movie with Spanish subtitles.

The reference file being compiled will not only contain user preferences and information regarding the type of media player, but can also include information regarding the device’s memory and buffer sizes, access and processor speeds, network capabilities as well as information around billing, DRM, customer feedback, interactivity with the content and executable scripts that control what happens if play is paused or when the movie has ended.

FIGURE 3: COMPILING THE VIDEO STREAM IN LINIUS' WORK FLOW



Source: Company patent filing, TMT Analytics

### Reference file can include advertisement markers on timeline

Additionally, the reference file may include markers on the timeline of the video file where advertisement can be inserted into the video stream, for instance in case of free video streams, such as YouTube. In this example, where video is streamed to an iPad, the ad feed may be based on cookies and other user specific information gathered by tracking software on the iPad.

Once the reference file is completed, uploaded to the video content server and accessed by the player interface on the Linus system, the player interface communicates with the media player on the iPad and starts to stream the movie into the buffer or memory of the iPad. But instead of streaming a movie that has been specifically transcoded to be played out on an iPad 2 in HD quality, using QuickTime 7.7.9 with Spanish subtitles, the video stream is simply the master file that is stored on the content provider's server.

### Specific features added to video stream on-the-fly

The player interface ensures that the video is played out according to all of the user's personal preferences and that all the individual elements, such as subtitles, ads etc are added to the video stream as different layers at the right time through a content linker and synchronizer on the Linus server. The fact that the individual content components are combined as different, independent, layers on the play out device rather than content that has been morphed into one stream at the server prior to streaming, provides tremendous flexibility for content providers. They are now able to dynamically change individual content components at the user level, such as advertising, instead of having a bulky content stream with all components fixed on the timeline of the video with no means to make the video stream user specific.

### No need to store different file formats

A key element of LNU's technology is that it enables the video content to be translated into a different structure, i.e. file format, based on the information in the reference file. This enables

video to be played out in a format that may be different from the format in which the master file is stored on the video content server by the content provider. This substantially reduces storage costs as only one file (the master file) now needs to be stored in various locations rather than many.

LNU enables optimized asset usage

LNU’s technology also allows different parts of the video feed to be streamed from different servers, which is important from a cost savings perspective. For instance, a content provider such as Netflix may choose to have the first few minutes of a movie streamed to a viewer from a fast, but relatively expensive server, to make sure viewers can start viewing a movie immediately after hitting play. After the first few minutes have been buffered on the play out device, the content provider may switch to streaming the rest of the movie from a slower, less expensive, server.

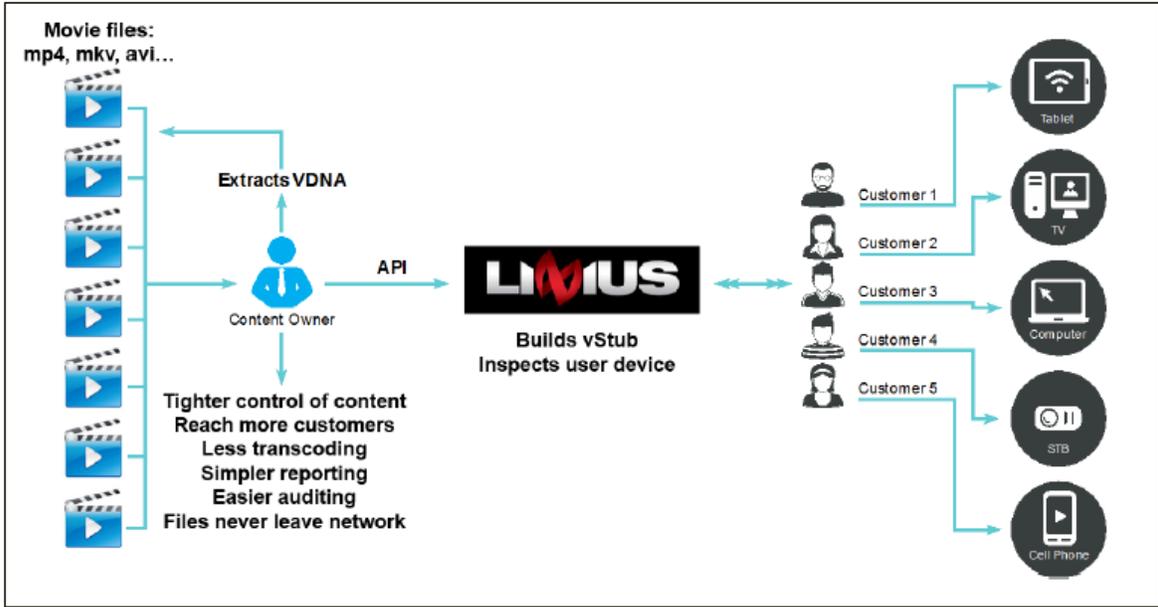
How it’s done: smart video processing behind the scenes

The basics of video compression

When video is streamed across networks, such as the Internet or a cable network, it is compressed to limit the file size and save bandwidth. Compression of video essentially means leaving out as much unnecessary information as possible. This is accomplished by only including information in the video that changes from one frame to the next.

As an example, movements in a video of an interview are usually limited to facial movements, i.e. the mouth, eyes and head. The background may not change for many seconds, which means that the background only needs to be streamed once until it changes, for instance when the shot changes from the interviewee to the interviewer, which requires a new frame to be sent that includes the new background. In the meantime, all the facial changes are streamed as they occur. As a consequence of this streaming protocol, encoding software can substantially reduce the amount of data that needs to be sent across the network.

FIGURE 4: LNU’S MADE-TO-ORDER VIDEO PLAY OUT MODEL



Source: Company, TMT Analytics

## Keyframes are set as reference points

In today's video streams the number of frames per second typically varies from 16 to more than 30 depending on the video quality that is required; more frames per second mean a higher video quality. In order to determine which frames need to be streamed in their entirety, the encoding software uses so-called keyframes as reference points to determine if something has changed in the video stream, e.g. a scene change. Keyframe frequency in a video stream can range from less than 2 seconds to more than 10 seconds. Keyframes are always streamed in full with non-keyframes being streamed only partially or not at all.

## Indexing the keyframes provides a "virtual video"

LNU's technology indexes all the keyframes in a video stream, leaving all other frames untouched. In the case of a video stream consisting of 25 frames per second with a keyframe rate of 5 seconds, this compression reduces the number of frames by a factor of 125 (one keyframe for every 125 actual frames). A one-hour video file of 1GB can be reduced to an 8MB file through this compression technique.

In a next step, LNU's technology indexes these keyframes using pointers, which are very small data blobs pointing to the individual keyframes. The total file size of such an index is less than 100kb.

So instead of the full size video file, this virtual video, also known as the vStub, can now be used to manage the video stream. The vStub itself does not contain any video or audio data, only references to the keyframes of the original video file.

*The combination of virtual video on the content servers and the earlier-discussed, viewer-specific reference files created for individual play outs, enables LNU's data-light video processing model.*

## Business model: software for video workflow and ad engines

LNU has largely completed the development of the core technology. Focus has shifted to building showcases for three key segments of the total addressable market initially, i.e. for the transcoding market, the Content Delivery Networks (CDN) and the play out phase of the market, in particular video personalization. These three segments might be considered low hanging fruit in a very large orchard. E.g. the CDN market alone is worth US\$ 5BN annually. The other five segments of the video processing market will be addressed by the company in due course, i.e. after commercial roll out in the initial three segments.

Currently developing showcases for three initial target markets:

1. Personalization of ads in TV streams potentially the largest opportunity

LNU's first showcase addresses, what we believe to be, the largest revenue opportunity for the company. Video personalization in TV streams, or more accurately, ad personalization in terrestrial TV streams, is essentially an untapped market globally, while TV advertising is expected to total US\$ 181BN in 2016 (Source: PWC).

In today's media landscape, above-the-line advertising, i.e. large scale ad campaigns in newspapers, on TV, radio etc, essentially equal carpet bombings of consumers with all sorts of advertising without the advertisers really knowing who "consumes" their ads. Of

course advertisers do have some levers to play with, e.g. more educated viewers will likely watch more news and current affairs programs so advertising around such programs should enable advertisers to partially capture that demographic.

However, above-the-line marketing is not nearly as sophisticated as online advertising where all sorts of tracking software, cookies, social media profiles and information regarding prior web searches on search engines, such as Google, provide quite a granular profile of individual web surfers.

#### Partnering with DigiSoft to commercialize the technology

Together with DigiSoft, a provider of video workflow software, service platforms and STB software used by cable operators, Telecom and service providers, LNU is developing the capabilities to add personalized advertisements to video streams. The goal is to integrate LNU's technology into DigiSoft's existing workflow products. All development work around the Application Programming Interfaces (API's) is being done by LNU. The aim is to directly reach pay-TV providers, who are existing DigiSoft customers.

In our view, the potential for media companies, cable operators and pay-TV providers to be able to offer their advertising customers a way to personalize advertising at the level of the household or at the individual viewer level, is extremely valuable.

#### 2. Less transcoding can result in huge cost savings for media companies

As illustrated earlier, LNU's technology has the potential to largely eliminate the need for transcoding. If only one, or just a few, transcoded video files suffice to service most possible combinations of file formats, aspect ratios and quality levels, the associated transcoding costs for the media industry could potentially fall by more than 80% to 90%, i.e. essentially linear to the reduction in workflow.

The value proposition around this opportunity is what LNU aims to capture in this showcase and eventually in a commercial software suite for media companies.

#### 3. Storage requirements through Content Delivery Networks will fall drastically

On the back of a drastic reduction in the number of video files required by a media company to service all of the different specifications of its customers' playback devices, it is easy to see that content delivery will also undergo some major changes, especially in terms of storage. Video content will still need to be stored on large servers around the world and more granularly around the edge of the Internet to facilitate fast streaming. However, rather than a few hundred different versions of each piece of content, only one, or just a few different versions will need to be stored at each location when media companies use LNU's technology.

The substantial reduction in storage and hosting costs is part of the third showcase LNU is currently developing and trialing. We expect the cost savings opportunity for media companies to be comparable to the opportunity in the transcoding market, i.e. a linear anticipated cost reduction of at least 80%.

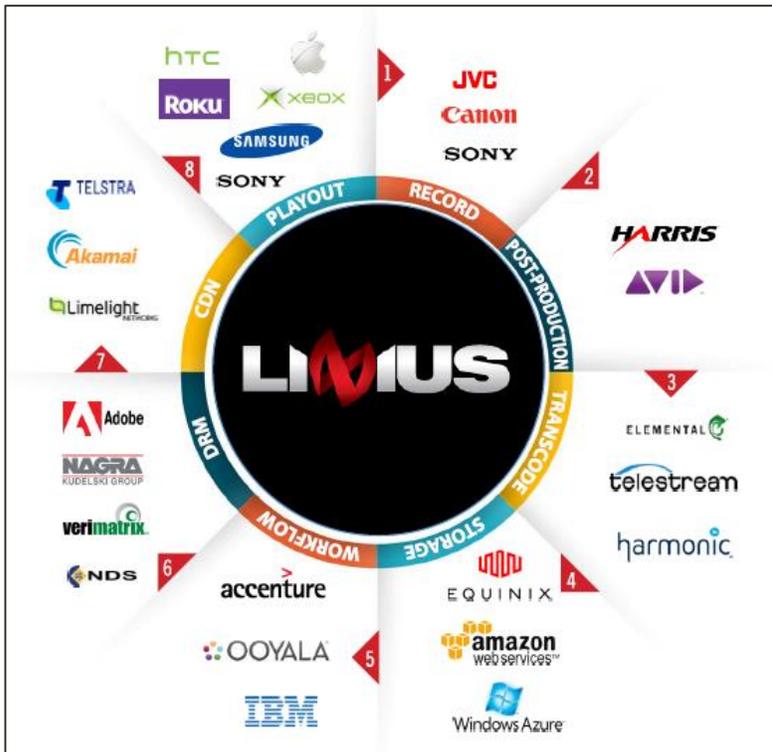
*Following these three showcase deployments in 2016, LNU aims to release its first commercial software products to the transcoding, CDN and personalized ads markets towards the end of 2016 or early 2017.*

Reseller strategy tailored to individual segments

Given that LNU addresses a well-established B2B industry with incumbent players and structures, the company will predominantly be selling through channel partners in revenue sharing agreements. This model reduces the need for LNU to build up a large sales force early on. The aim is to have one to three channel partners in each segment, while LNU may occasionally sell directly to enterprise customers itself.

DigiSoft is LNU's first channel partner (in the cable/STB segment) but we would expect up to nine channel partners to be signed on to address the initial three market segments in the near to medium term.

FIGURE 5: INCUMBENTS BOTH COMPETITORS AND POTENTIAL PARTNERS



Source: Company, TMT Analytics

Various models possible in STB/cable market

Players in the STB segment include Cisco (acquired Scientific Atlanta in 2005), Pace, Technicolor, Broadcom, Huawei, Intel and Comcast, to name a few, which could be potential channel partners. Additionally, players selling into these manufacturers, such as software vendor DigiSoft, are likely channel partners for LNU as well.

CDN customers likely to be a major pull factor for LNU adoption by CDN providers

Given the nature of cloud services and distributed computing, many of the non-Telco players in the CDN market have their roots in software development. Therefore, many of those players may have proprietary software running on their platforms for content delivery purposes, rather than third party software. Additionally, many of those companies, including the Telco/carrier

CDN players, may not be particularly keen to see revenue leak away due to a smarter, more cost efficient way to host and stream video content.

However, we would expect pressure from LNU's future CDN customers, such as media companies and cable operators, to be a substantial pull factor in driving CDN players to adopt LNU's solution as part of their offering. In other words, we believe some of LNU's future customers may become the company's biggest advocates, potentially driving LNU's penetration of the CDN market.

Various reseller models are possible in this segment. For instance, Akamai is one of the largest players in this space and might make a good fit for LNU. At the same time, on top of selling its own CDN capacity, AT&T is also an Akamai reseller. Hence, a player like AT&T might also make a good fit as a reseller for LNU. The same is true for EdgeCast (owned by Verizon), South Korean CDNetworks (owned by Japanese Telco KDDI) and Nasdaq-listed Limelight Networks as these are other large CDN providers, whose services are resold through a number of Telco/Carriers, such as NTT, TPG, TeliaSonera, Telecom Italia, Bell and Telus.

Suffice it to say, there are many dozens of players in the CDN space, which allows LNU to develop a highly specific channel partner strategy in this segment, for instance based on geographies.

#### Both hardware and software based companies selling into the transcoding market

When it comes to the transcoding segment of LNU's addressable market, there are two types of product solutions. Software-only solutions include offerings such as Elemental Technologies (acquired by AWS), Telestream's Episode, Microsoft's Expression Encoder and Adobe's Media Encoder. Additionally, companies like Harmonic and Cisco (through the acquisition of Inlet Technologies in 2011) provide integrated hard- and software solutions. We believe both types would suit LNU's reseller model well, even though we believe the software-only companies may be more agile in incorporating LNU's technology into their own product offering due to potentially fewer (legacy) hardware restrictions.

## Revenue model being finalized

### Revenue sharing agreements with resellers

LNU is currently working to finalize a number of aspects around its revenue model. The eventual model will be dependent on the market structure of the specific sub segment, the value proposition of LNU's solution in each segment and existing offerings from competitors. In each model we envision LNU setting up revenue sharing agreements with the respective resellers in the sub segments, which we expect would see LNU receive at least 50% of revenues.

### The value proposition will be different in each segment

In marketing LNU's solution to enterprise customers, LNU's resellers will likely take different approaches and apply different pricing models. A common pricing model is to offer the software suite to enterprise customers at a price that is dependent on the cost savings realized through use of the product. E.g. the LNU suite might be used by a media company for transcoding in return for 10% or 15% of the achieved cost savings. A similar model could be applied in the CDN segment where savings on storage costs can serve as a basis for pricing.

Alternatively, in situations where use of the LNU software suite results in additional revenues for the enterprise customer, a fee based on this additional revenue could be agreed. In such situations we would expect fees to be closer to 20% of these additional revenues.

In video personalization we can see a model whereby cable operators pay a fee per personalized ad or per cable subscriber. In turn, this fee will depend on the value cable operators' advertising customers attribute to personalization of ads and the level of granularity that can be achieved when targeting individual viewers.

In segments that will be addressed at a later stage, such as post-production/editing, a pricing model with a fixed annual license fee or a fee per film edited (or a combination thereof) may be implemented.

## Very substantial market potential as industry moves to cloud

One of the key developments in video processing in recent years has been the move from traditional, on premise, hardware-based workflow models to software-based models that operate in the cloud. Software-only workflow essentially lets media companies and other producers of video content manage most of the workflow on third-party servers, substantially reducing the need to invest in hardware. Video virtualization is a prime example of this.

All three of LNU's initial addressable market segments are experiencing two-tiered growth: mid to high single digit growth for the traditional, hardware-centric sub segments within each market and double digit growth for the cloud-based, software solutions, such as LNU's technology.

### LNU's technology very well suited to personalized ads in IPTV

The global market for TV advertising is very substantial with an estimated size of US\$ 181BN in 2016. PWC estimates growth of 4.1% for the overall TV advertising market through 2019 with low to mid-single digit growth for terrestrial and multichannel TV advertising. However, the online TV advertising market is expected to grow between 15% and 23% between 2016 and 2019.

In our view, the latter segment is very interesting for LNU as IPTV (Internet Protocol TV) has a substantially better ability to tap into user-specific information, collected through web surfing behavior, online searches, social media etc, than terrestrial TV, which we expect will still largely employ a one-size-fits-all approach in the next several years. Therefore, we expect LNU's technology will be able to generate a lot of traction in the Internet TV segment where ads personalization is concerned.

### Broader TV market not yet able to personalize advertising

In our modelling we have assumed LNU will be able to address the part of this market that has the ability to move to ad personalization. For terrestrial TV this means the sector will need to deploy technological capabilities to retrieve user-specific information on which to base personalized ads. While gathering of personal information should become easier over time as STB's become increasingly sophisticated, the broader terrestrial TV market isn't there yet.

Consequently, in our modeling we have taken a conservative view as to the proliferation of personalized ads in the TV market as a whole, starting at 2% in 2017, and assume LNU will be addressing a market growing by 4.1% on average in the next four years.

We have also assumed LNU's market share will start off at a very low level, LNU being a new market entrant in a huge global market.

Given that advertisers on average are willing to pay approximately 2.7x more for personalized ads compared to generically addressed ads, we have multiplied the ads market value LNU captures (based on its market share) by 2.7x to arrive at a value of the personalized TV ads market for LNU (Figure 6).

FIGURE 6: LNU REVENUE MODEL FOR PERSONALIZED ADS IN GLOBAL TV MARKET

(in US\$ BN)	2015	2016F	2017F	2018F	2019F	2020F
Global TV advertising	173.8	180.9	188.3	199.5	211.6	224.5
- Online TV	5.6	6.6	7.7	9.1	10.9	12.9
- Multichannel	41.5	43.6	45.9	49.0	52.4	56.0
- Terrestrial	126.6	130.6	134.8	141.4	148.3	155.5
<b>% of industry able to provide personalised ad streams</b>						
- Online TV	95%	95%	95%	95%	95%	95%
- Multichannel	45%	48%	51%	54%	57%	60%
- Terrestrial (incl. Free-to-air)	30%	33%	36%	39%	42%	45%
<b>LNU addressable market</b>	<b>62.0</b>	<b>70.3</b>	<b>79.2</b>	<b>90.3</b>	<b>102.5</b>	<b>115.9</b>
LNU market share in personalised ad streams	0%	0%	0.02%	0.05%	0.06%	0.10%
TV ads value to be upscaled to personalised ads (US\$ M)	0	0	16	45	61	116
Value of personalised TV ads (multiplied by 2.7x)	0	0	43	122	166	313
Added value (by LNU solution)	0	0	27	77	105	197
License fee (% of added value)	-	-	4.0	11.5	15.7	29.6
Revenue share for reseller	-	-	2.0	5.8	7.8	14.8
<b>Net Revenues to LNU (US\$ M)</b>	<b>-</b>	<b>-</b>	<b>2.0</b>	<b>5.8</b>	<b>7.8</b>	<b>14.8</b>
<b>Net Revenues to LNU (A\$ M)</b>	<b>-</b>	<b>-</b>	<b>2.7</b>	<b>7.7</b>	<b>10.5</b>	<b>19.7</b>

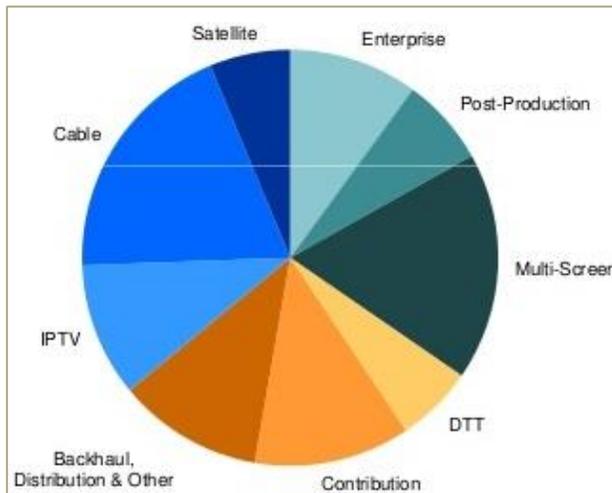
Source: TMT Analytics, PWC

The difference between these two is what we have called the added value for customers derived from implementing LNU’s solution, which is essentially additional advertising revenue for media companies. This forms the basis for an assumed license fee of 15%, i.e. customers pay a fee of 15% of the additional revenue to LNU’s reseller. In turn, LNU and the reseller split the revenues 50/50, resulting in a net revenue stream to LNU.

### Cloud-based video transcoding is driving overall transcoding market growth

The overall transcoding market is expected to grow between 6% and 15% annually through 2020, according to industry researchers, such as ABI Research and Infiniti Research. Frost & Sullivan estimate growth at around 20% annually. However, the high growth segment within this market is the SaaS-based, or cloud-based, transcoding market, i.e. where content and applications are stored off-premise for the transcoding process.

FIGURE 7: BREAKDOWN OF TRANSCODING MARKET



Source: Frost & Sullivan, TMT Analytics

Various estimates put growth for this transcoding sub segment in excess of 50% annually in the next several years (including Frost & Sullivan's), driven by the extremely flexible cost structure of cloud-based transcoding, facilitated by the absence of fixed infrastructure costs. We believe LNU's software-only technology is ideally suited for cloud-based workflows. Consequently, we would expect the company to be able to tap into this high-growth area of the transcoding market with applicability of LNU's offering to most sub segments of the transcoding market illustrated in Figure 7.

There is a wide variety of players in the transcoding market, ranging from small, niche players to large tech companies that entered the market through acquisitions in recent years. Some of the companies that have gained a lot of traction in the past few years include Encoding.com, Envivio, Elemental Technologies (AWS), Harmonic and Thomson Video Networks. Listed market participants include Cisco, Ericsson and Arris. HaiVision Systems, Harris Broadcast, VBrick Systems, Motorola Mobility and Wowza Media are some of the other key players in this space.

**Opportunity for those entrants that bring efficient and cost effective innovations to market**

It will be obvious that transcoding is a crowded market with well-established incumbents, which would typically make it quite difficult to break into for new entrants. However, we believe this sector has shown that players, such as service provider Encoding.com, that bring substantial efficiencies to market through innovative new offerings, tend to gain traction with customers quite quickly. In other words, this sector is very open to new ideas. Hence, we believe LNU's offering, which is quite revolutionary in many respects, will be able to gain strong momentum early on.

FIGURE 8: LNU REVENUE MODEL FOR TRANSCODING MARKET

(in US\$ M)	2015	2016F	2017F	2018F	2019F	2020F
Transcoding market size	1,134	1,304	1,500	1,725	1,984	2,133
LNU market share across global transcoding market	0.0%	0.0%	0.5%	1.5%	2.0%	2.5%
Customers current transcoding costs	-	-	7.5	25.9	39.7	53.3
Cost savings potential from LNU solution	80%	80%	80%	80%	80%	80%
Customers cost savings from using LNU solution	-	-	6.0	20.7	31.7	42.7
License fee (% of cost savings)	-	-	0.8	2.6	4.0	5.3
Revenue share for reseller	-	-	0.2	0.8	1.2	1.6
<b>Net Revenues to LNU (US\$ M)</b>	-	-	<b>0.5</b>	<b>1.8</b>	<b>2.8</b>	<b>3.7</b>
<b>Net Revenues to LNU (A\$ M)</b>	-	-	<b>0.7</b>	<b>2.4</b>	<b>3.7</b>	<b>5.0</b>

Source: TMT Analytics, Frost & Sullivan, ABI Research, Infiniti Research

Given that Transcoding is such a crowded market, we have been conservative in our market share assumptions for LNU, being the new kid on the block, starting at 0.5% in 2017 and growing to 2.5% by 2020. In our model, LNU should be able to deliver its customers savings of 80% of their transcoding cost, which forms the basis for an assumed license fee of 12.5%. In our model the reseller gets 30% of that license fee in a revenue share agreement with LNU, resulting in a net revenue stream to LNU as illustrated in Figure 8.

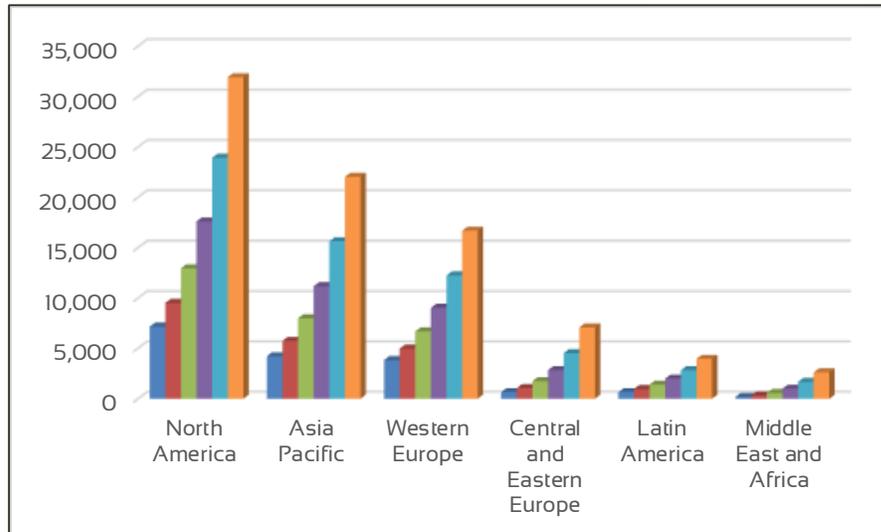
**Growth in Content Delivery Networks driven by explosion of online video**

The CDN market is growing very strongly, at a CAGR of 25.0% through 2020 according to MarketsandMarkets, resulting in a market that is expanding from approximately USD 5Bn in 2015 to nearly USD 12.8Bn in 2020. A lot of this growth is driven by the explosion of video on the Internet. While video accounted for 64% of Internet traffic in 2014, Cisco estimates this share will rise to 80% globally by 2019.

This growth will be driven by Over-The-Top (OTT) video delivery, e.g. through Netflix, as well as more people being connected to the Internet globally. Additionally, the increasing popularity of high quality video, such as 4K, will drive Internet usage of video as well as storage and hosting capacity.

On a regional basis we can see that North America will remain the largest market for CDN traffic in the next several years (Figure 9). However, growth in NA of 35% (CAGR '14-'19) is expected to lag the global average of 38%. Of the larger markets, AsiaPac is expected to show the highest growth rates at 39%, while CEE is expected to grow by 61%, albeit from a substantially lower base.

FIGURE 9: CDN TRAFFIC 2014 THROUGH 2019 BY REGION (PETABYTES/MONTH)



Source: Cisco, TMT Analytics

LNU's offering has the potential to reduce CDN traffic growth substantially as the technology reduces the need for many different copies of the same video file and based on the above statistics, it's obvious that North America, AsiaPac and Western Europe are the most attractive CDN markets for LNU to address initially. However, we believe individual countries in the smaller regions, such as Russia, South Africa and Brazil, have sufficiently large internal markets to be interesting for LNU as well in the early stages of commercialization.

FIGURE 10: LNU REVENUE MODEL FOR CONTENT DELIVERY NETWORK MARKET

(in US\$ M)	2015	2016F	2017F	2018F	2019F	2020F
CDN market size (costs to the sector)	5,000	6,250	7,813	9,766	12,207	12,817
LNU market share across global CDN market	0.0%	0.0%	0.3%	0.5%	1.0%	1.5%
LNU's customers current CDN costs	-	-	23.4	48.8	122.1	192.3
Cost savings potential from LNU solution	80%	80%	80%	80%	80%	80%
Customers cost savings from using LNU solution	-	-	18.8	39.1	97.7	153.8
License fee (% of cost savings)	-	-	2.3	4.9	12.2	19.2
Revenue share for reseller	-	-	0.7	1.5	3.7	5.8
<b>Net Revenues to LNU (US\$ M)</b>	-	-	<b>1.6</b>	<b>3.4</b>	<b>8.5</b>	<b>13.5</b>
<b>Net Revenues to LNU (A\$ M)</b>	-	-	<b>2.2</b>	<b>4.6</b>	<b>11.4</b>	<b>17.9</b>

Source: TMT Analytics, MarketsandMarkets

We have modelled LNU's revenues from the CDN market in a similar way to the transcoding market, i.e. a small but growing market share defines LNU's customers' CDN costs in our model, which we assume LNU can reduce by 80%. These cost savings form the basis for a 12.5% license fee of which LNU's reseller takes 30%, resulting in a net revenue stream to LNU as illustrated in Figure 10.

Based on the revenue models for the initial three verticals LNU will be addressing, we arrive at revenue and earnings projections as summarized in Figure 11. These numbers do not include potential revenues from the other five verticals LNU aims to address in the medium term.

FIGURE 11: LNU EARNINGS SUMMARY TABLE

<i>A\$M</i>	2016F	2017F	2018F	2019F	2020F
Revenues	0.0	5.6	14.6	25.5	42.6
EBITDA	-2.0	0.1	4.3	10.0	20.5
EBITDA margins	N/A	1%	30%	39%	48%
NPAT	-1.9	-0.2	2.8	6.7	14.2
EPS fully diluted (c)	-0.003	0.000	0.004	0.009	0.019

Source: TMT Analytics

*We would like to emphasize that LNU's actual revenue model, i.e. its pricing levels, revenue sharing with resellers etc, is work in progress and still needs to be finalized by the company, which we expect towards the end of 2016, coinciding with the release of LNU's commercial products. Therefore, all our assumptions in the above revenue models are indications of what future revenue streams to LNU may look like.*

## Fair value based on Discounted Cash Flow

In valuing LNU we have abstained from using a peer group multiple valuation. LNU is entering the initial stages of commercialization with first revenues expected in 2017. Any valuation based on peer group multiples looking at 2017 and 2018 would be heavily distorted and therefore of little use, in our view.

### Discounted Cash Flow valuation to gauge longer term value potential

Instead we have valued LNU based on a DCF model, which we believe more accurately captures LNU’s long term potential. We have assumed a long interest rate of 2.5%, a risk premium of 4.3%, a marginal tax rate of 30%, an unlevered beta of 1.5x and long term growth of 3%. These assumptions lead to a theoretical Weighted Average Cost of Capital (WACC) of 9%, used to discount future cash flows.

### Substantial inherent investment risk warrants high discount rate

However, whilst this theoretical WACC may be appropriate for more mature companies with established cash flows, we believe early-stage, pre-revenue, companies require a substantially higher discount rate in order to more appropriately reflect the inherent risk involved with investing in such companies.

In our view, a WACC of at least 15% to 20% is required, depending on the individual investors’ risk appetite, resulting in a fair value range as illustrated in Figure 12.

FIGURE 12: DCF-BASED FAIR VALUE RANGE PER SHARE BASED ON DIFFERENT DISCOUNT RATES

15%	0.49
16%	0.43
17%	0.39
18%	0.35
19%	0.31
20%	0.28

Source: TMT Analytics

### Fair value range is not a price target yet, but provides insight into long term value

This valuation range is not yet a price target for LNU as the underlying assumptions regarding revenues, costs and growth rates are dependent on the actual pricing models and revenue sharing agreements that LNU will be employing when it starts commercial roll out of its various products. These pricing models and revenue sharing agreements are work in progress at this stage. Additionally, the company is still pre-revenue and all three products for the initial three addressable market verticals still need to be rolled out and prove themselves in the marketplace.

In other words, we believe there are currently too many moving parts to issue a price target for the stock.

However, the company will have solidified its pricing models and revenue sharing agreements ahead of commercial roll out, which will bring more certainty around these variables. Additionally, when LNU starts generating revenues on the back of customer wins and additional channel partner agreements, there will be substantially more insight into customer appetite for the products. Therefore, we believe that the fair value range above does provide a good sense of LNU’s upside potential.

Going forward, as the company starts hitting milestones regarding revenues and operational earnings, the investment case will gradually de-risk, allowing for lower discount rates and higher fair values in our DCF model.

## Conclusion

We believe the potential of LNU's offering in the video streaming market is very substantial, in particular for the personalized TV advertising market. In our view, the cooperation with DigiSoft is a major endorsement in this respect.

### Start coverage with a BUY recommendation

LNU's revenue model is still being developed and the final pricing model may be different to what we have assumed in our model. Therefore, we refrain from issuing a price target based on our preliminary revenue indications.

However, our DCF model, based on these preliminary numbers, does indicate a fair value of at least A\$ 0.28 per share, i.e. well in excess of the current share price, under a high risk assumption (WACC of 20%). Therefore, we start our coverage of LNU with a BUY rating.

### Near to medium term catalysts

Completion of the initial three showcases LNU has been developing, which we expect in the course of the next several quarters, will enable the company to convert the interest received from industry players so far into concrete agreements.

We expect LNU to be able to sign channel partners ahead of actual commercial roll out, based on showcase demonstrations.

Additionally, the company should be able to attract multiple enterprise customers directly rather than through channel partners, closer to the commercial launch date, allowing for higher revenues per customer in the absence of revenue sharing in these situations.

## Appendices

### Board of Directors

Christopher Richardson (Executive Director and CEO): Mr. Richardson is an accomplished internet video executive with more than 20 years' experience leading tech companies in the US, Europe and Asia. He has served in managerial roles for several Silicon Valley start-ups including U4EA Wireless and NextHop Technologies. Prior to founding NextHop, Mr. Richardson helped to build the early internet as a software engineer at MERIT Networks and was Visiting Professor of Internet Routing at St Petersburg State Technical University in Russia.

Stephen Kerr (Executive Director and CFO): Mr. Kerr is a qualified chartered accountant and chartered company secretary. He has more than 15 years' experience as a CFO and governance professional having held senior finance positions in private and publicly listed companies in IT, business services, logistics, transport and life sciences.

Stephen McGovern (Non-Executive Director): Mr. McGovern has more than 20 years' experience as an executive in telecommunications, media sales and pay TV and is managing director of cloud call recording company Dubber Corporation Ltd (ASX: DUB). He has led several established companies, both domestically and internationally, which have penetrated new and emerging markets and have required a strong sales and solutions focus.

### LNU SWOT Analysis

#### Strengths

- First-to-market with a patented technology that can potentially revolutionize business models in the CDN and transcoding sectors as well as other video work flow segments.
- The technology is ideally suited to facilitate personalized advertising in video streams, potentially delivering substantial revenue upside to media companies, cable operators, Telecom providers etc.
- LNU's asset-light channel partner model is flexible and over time should yield EBITDA margins in excess of 60%, resulting in highly attractive ROIC's.

#### Weaknesses

- The company's operating track record is still limited, which may limit the speed of commercialization.
- Unfamiliarity with the technology and integration into existing work flows may limit adoption and acceptance by potential customers.
- LNU will likely require additional funding to facilitate full-scale roll out, i.e. for marketing, sales and additional developers to maintain and further develop its technology, potentially diluting existing shareholders.

#### Opportunities

- In addition to the initial three segments LNU will be targeting near term, there are five more segments in the video work flow space that LNU can address in the medium term, substantially expanding the addressable market.
- Partnering with established players in the market may substantially expedite LNU's commercial roll out.

### Threats

- Large incumbents developing similar technology and selling into their installed base of customers may inhibit LNU's growth.
- Incumbents will likely defend their market share through various means, including discounts, bundled sales, cross subsidies etc, potentially limiting the speed of LNU's commercial roll out.
- While LNU's patent family provides a certain layer of protection against competitors copying the company's intellectual property, any legal defense against potential infringements will likely require substantial funds, which LNU may not have available if and when required, potentially inhibiting the company's future growth prospects.

### Patents

LNU owns twelve granted and pending patents in a number of geographies, including the United States, Australia, China, Europe, Singapore and Hong Kong. LNU's method and system for content delivery is described in the international patent PCT/AU2008/001190.

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