



ETC®  
Entertainment  
Technology Center



## 3D Update

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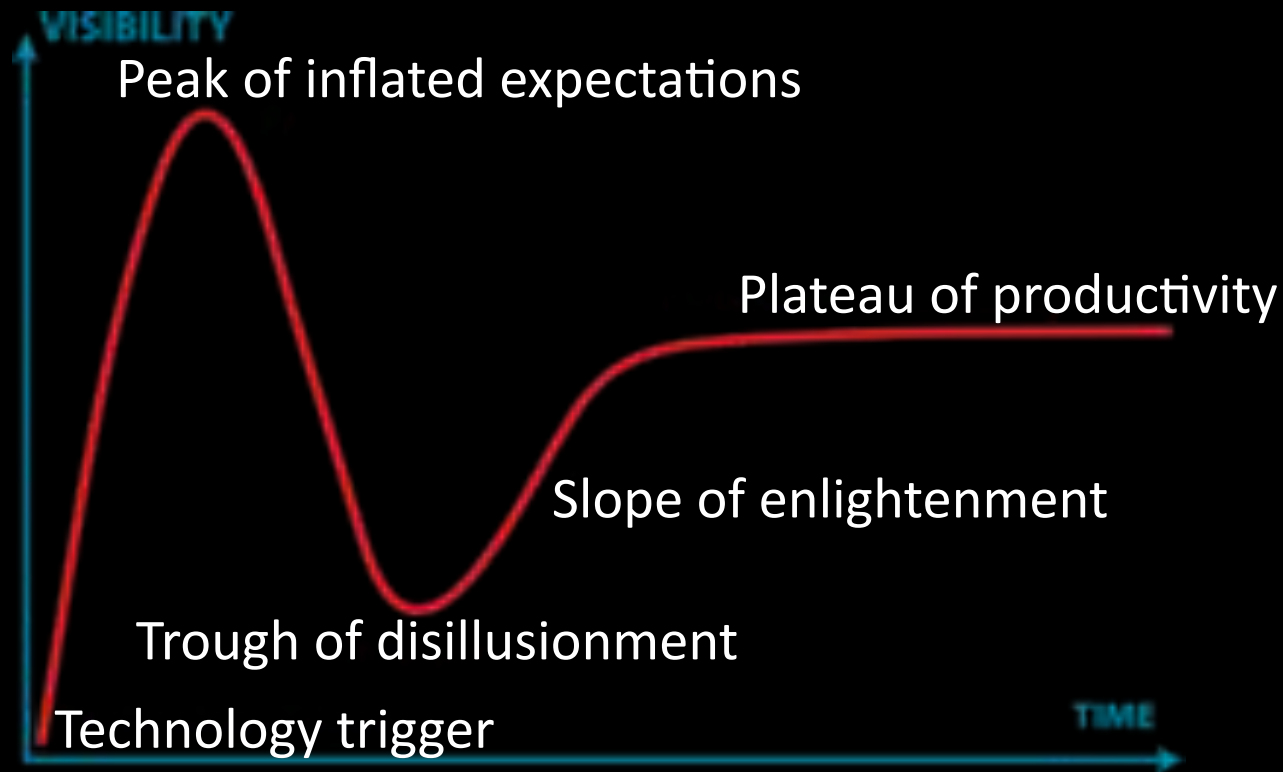
# How does 3D work?

- The main depth cues are monocular
- Disparity stimulates stereopsis
- Stereopsis signals **only relative depth**

Source: Dr. Jim Sheedy, Pacific University's 3D and Vision Conf., 6/1/11

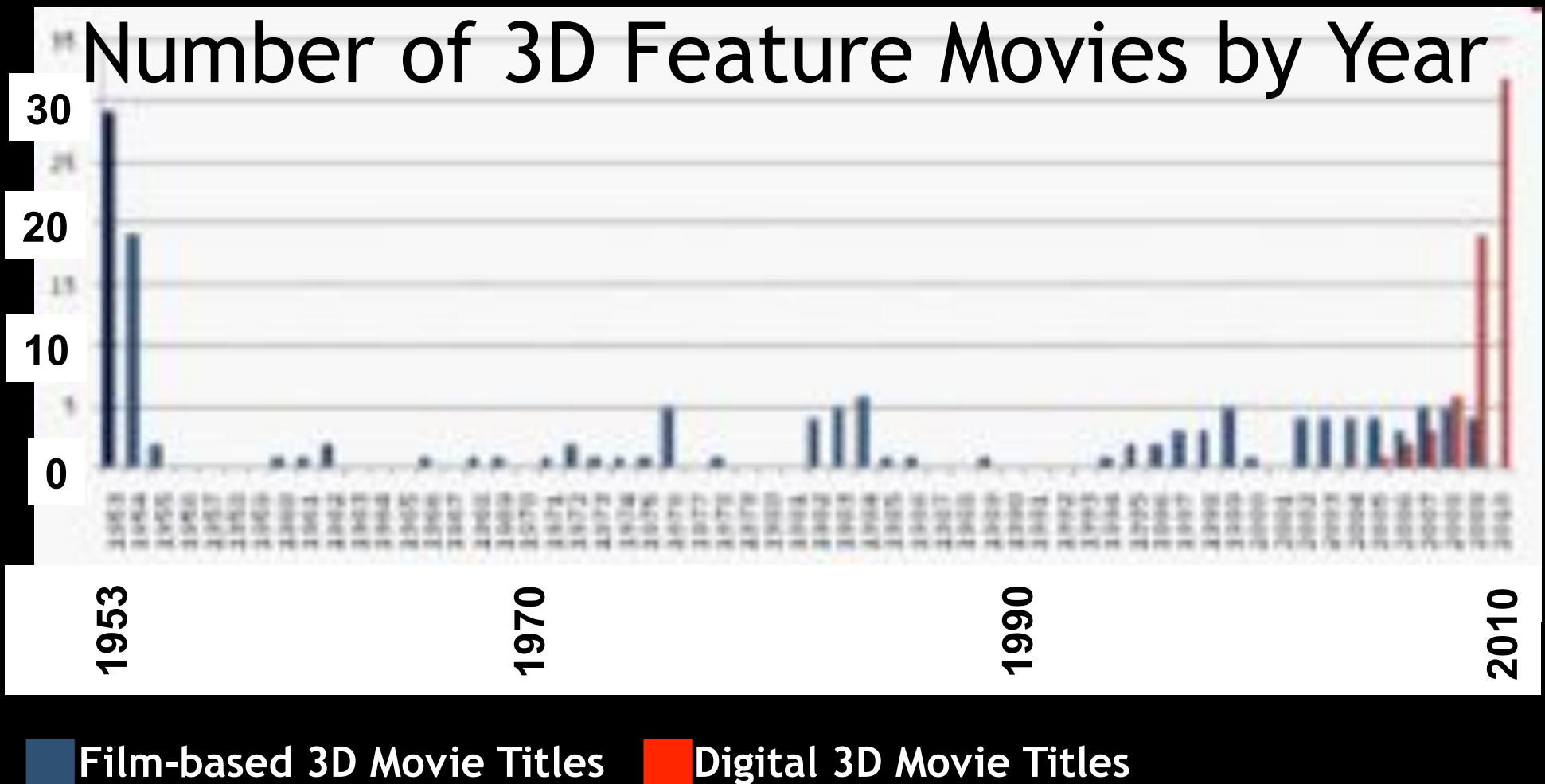
# Hype Cycle

(Gartner)



# 3D Cinema

# Number of 3D Feature Movies by Year



Source: Digdia ([www.Digdia.com](http://www.Digdia.com)), June, 2009 Report - Digital 3D Entertainment, From Theatre to the Home

# Leading 3D cinema systems



**RealD (polarized)**



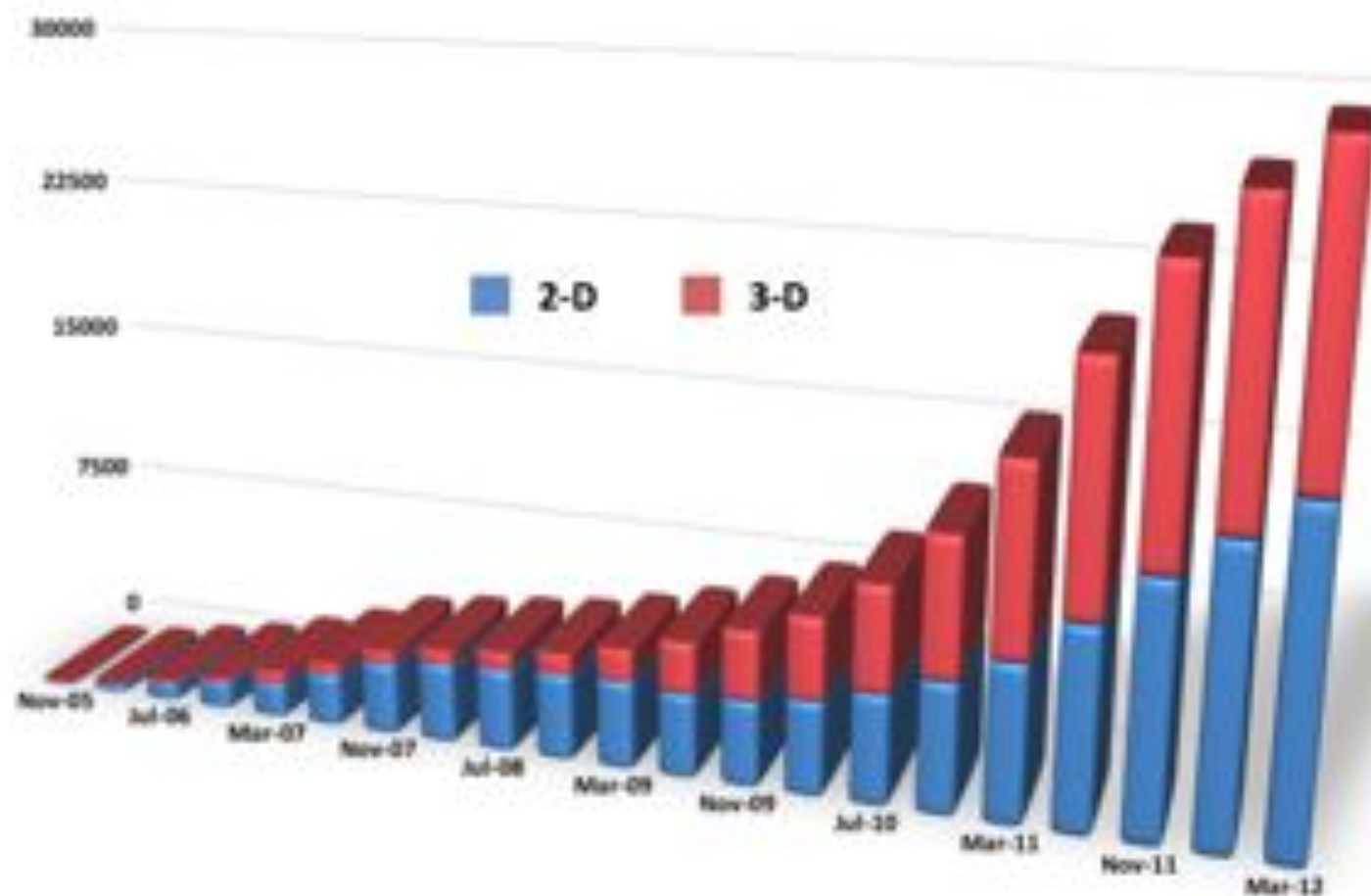
**MasterImage (polarized)**



**Dolby (color shift)**



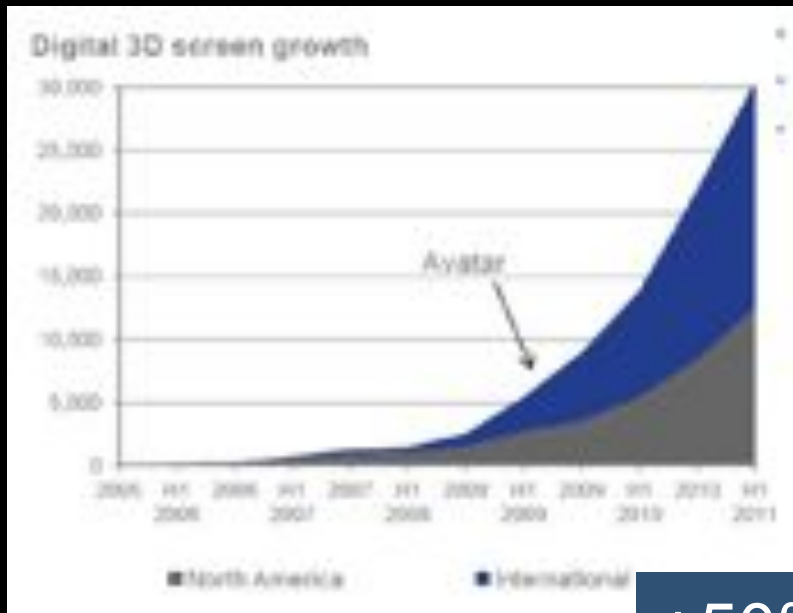
**XpanD (active shutter)**



data source  
Technicolor &  
Deluxe

## US & Canada Digital Rollout

# 30,000+ 3D screens worldwide



US/Canada  
China ↑  
France  
UK  
Germany  
Russia  
Mexico

China = 6000+ 3D Screens  
Dean, Beijing Film Academy  
4/27/12

+50% Cinemas worldwide are now digital  
+50% Digital cinemas are now 3D capable

(Source: 4 Reasons 3D Movies Aren't Just a Fad, Mashable, 12/22/11)

[http://www.studiodaily.com/main/news/headlines/Stereo-3D-Smartphone-Market-Poised-to-Explode\\_13567.html](http://www.studiodaily.com/main/news/headlines/Stereo-3D-Smartphone-Market-Poised-to-Explode_13567.html)



## Average per-screen revenue 3D screens versus 2D screens

Movie	3D Screens	3D Sales (M)	Average	2D Screens	2D Sales (M)	Average
Harry Potter 7.2	4250	\$ 72.70	\$ 17,098.00	6750	\$ 96.10	\$ 14,233.00
Transformers 3	4146	\$ 57.60	\$ 13,892.00	5154	\$ 40.10	\$ 7,788.00
Shrek Forever	3394	\$ 43.30	\$ 12,757.00	6106	\$ 27.50	\$ 4,507.00
How to Dragon	2363	\$ 29.70	\$ 12,568.00	4442	\$ 14.00	\$ 3,151.00
Pirates 4	3964	\$ 42.60	\$ 10,746.00	4136	\$ 48.60	\$ 11,758.00
Thor	3909	\$ 39.60	\$ 10,130.00	3741	\$ 26.40	\$ 7,057.00
Cars 2	3140	\$ 27.10	\$ 8,630.00	4550	\$ 41.00	\$ 8,980.00
Kung Fu Panda 2	3979	\$ 30.60	\$ 7,690.00	3521	\$ 37.40	\$ 10,623.00
Green Lantern	3200	\$ 23.70	\$ 7,406.00	4000	\$ 29.00	\$ 7,246.00

(Source: 4 Reasons 3D Movies Aren't Just a Fad, Mashable, 12/22/11)

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3D TV

# USA: Samsung and LG boost 3D LCD market share as Japanese rivals tumble

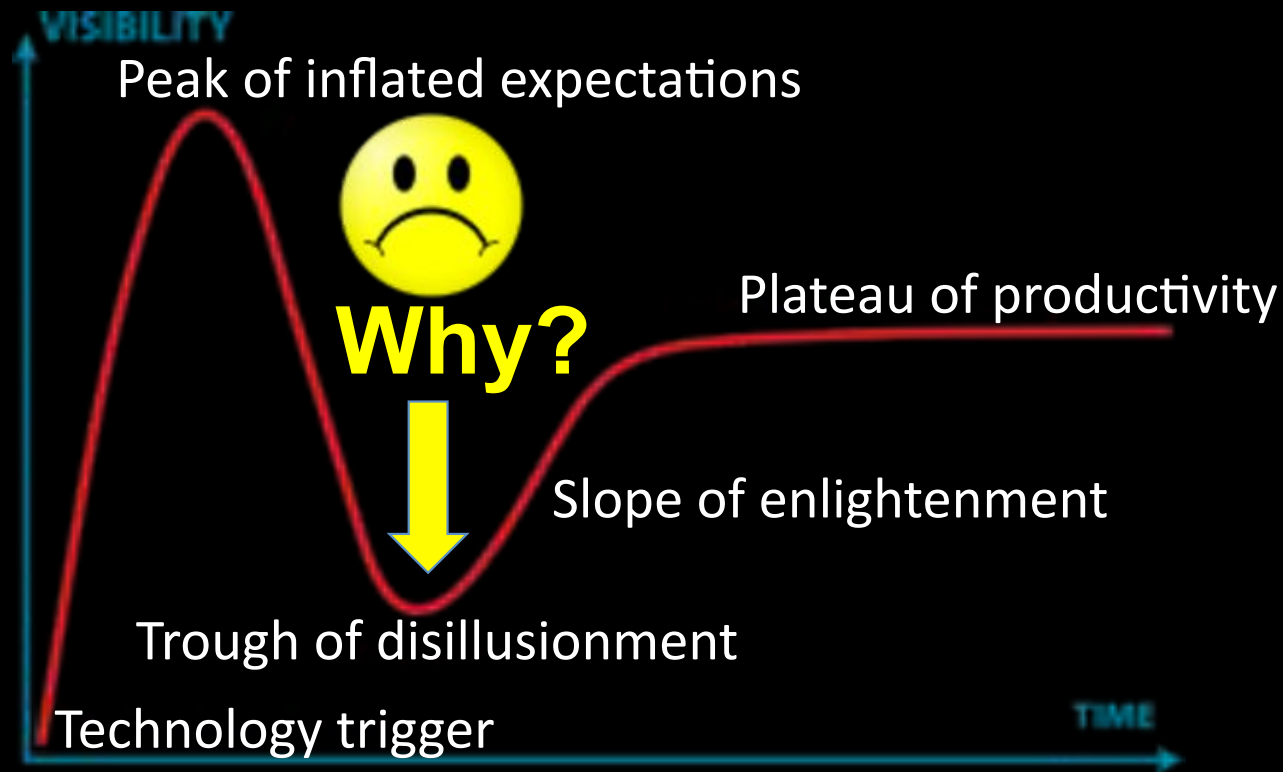
	1Q11	4Q11
Samsung & LG	56%	73%
Panasonic, Sharp, Sony and Toshiba	43%	25%
Samsung	48%	46%
LG	8%	27%

Active Shutter

Passive Polarized

# Hype Cycle

(Gartner)



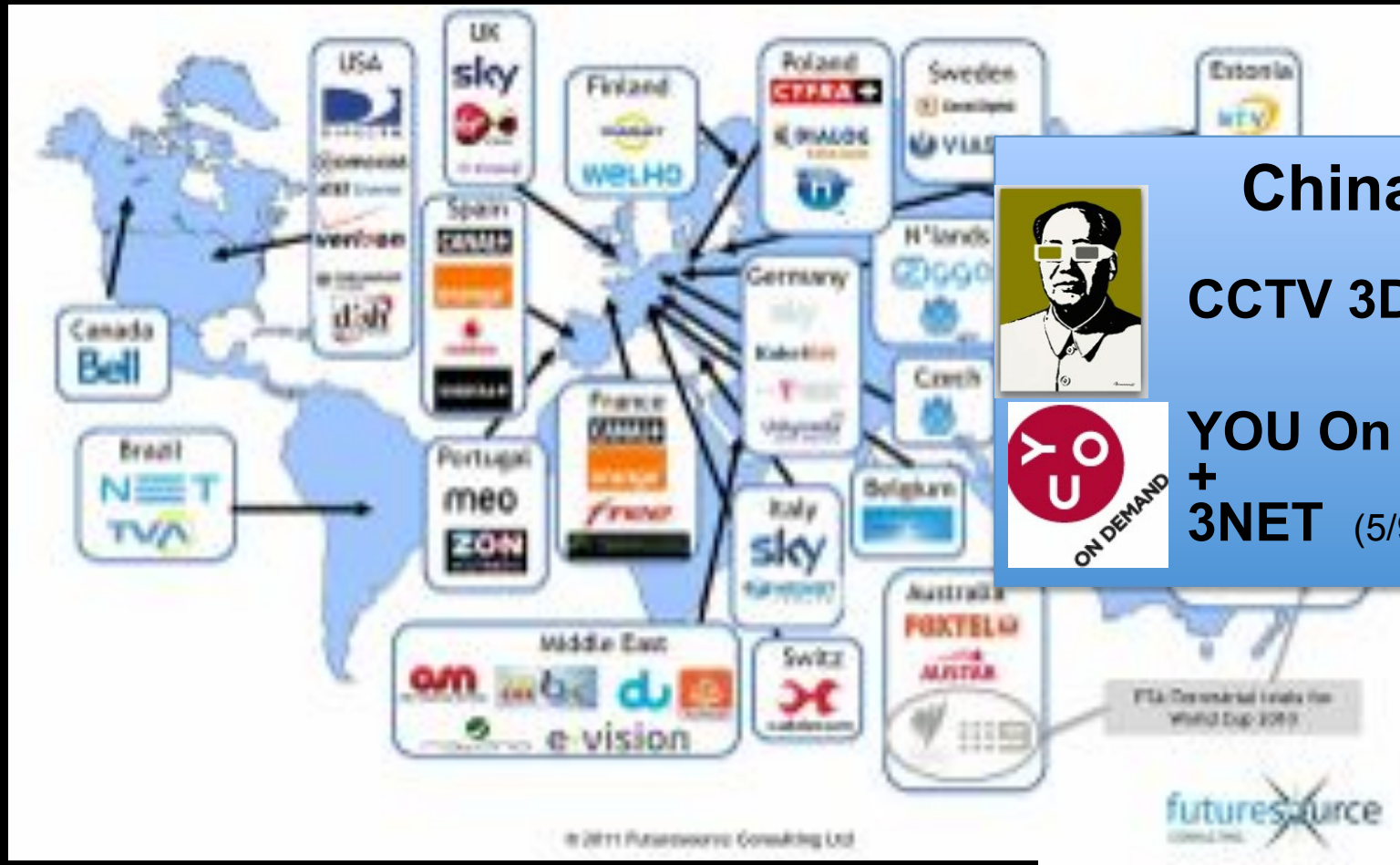
# Mad rush to market hurt 3D TV sales, prices are stabilizing, claims CES VP

- Lack of a clear **message** about 3D
- The **hype** surrounding 3D outweighed the ability of the suppliers to deliver hardware
- The paucity of native 3D **content** at the time
- A lack of **standardization** across the category
- There is a whole **supply chain**, and “we probably got things a little out of order”

Source: Brian Markwalter, SVP Research and Standards, CEA, [www.current.com.au](http://www.current.com.au), 2/24/12

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# 60 3D Broadcasters as of August 2011



Source: 3DRoundup.com, Jim Bottoms, Dir at Futuresource Consulting , 9/27/11  
(<http://3droundabout.com/2011/09/4969/by-the-numbers-let's-get-real-3dtv-is-advancing.html>)



3D Porn  
Hong Kong



Argentina  
Animation

# Movies Games TV Shows



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Turkey  
Live Action



Japan  
Games



# 3D Games

- Adjustable S3D

- Average gamer is 37 years old
- 42% are now women
- 55% play games on their phone or handheld

Source: Entertainment Software Assn. 6/11

- Call of Duty: Black Ops- \$650M in 5 days (\$1B in 9 mo.)
- Nintendo 3DS, Sony PlayStation, PC, others have 3D games

created by 3D driver



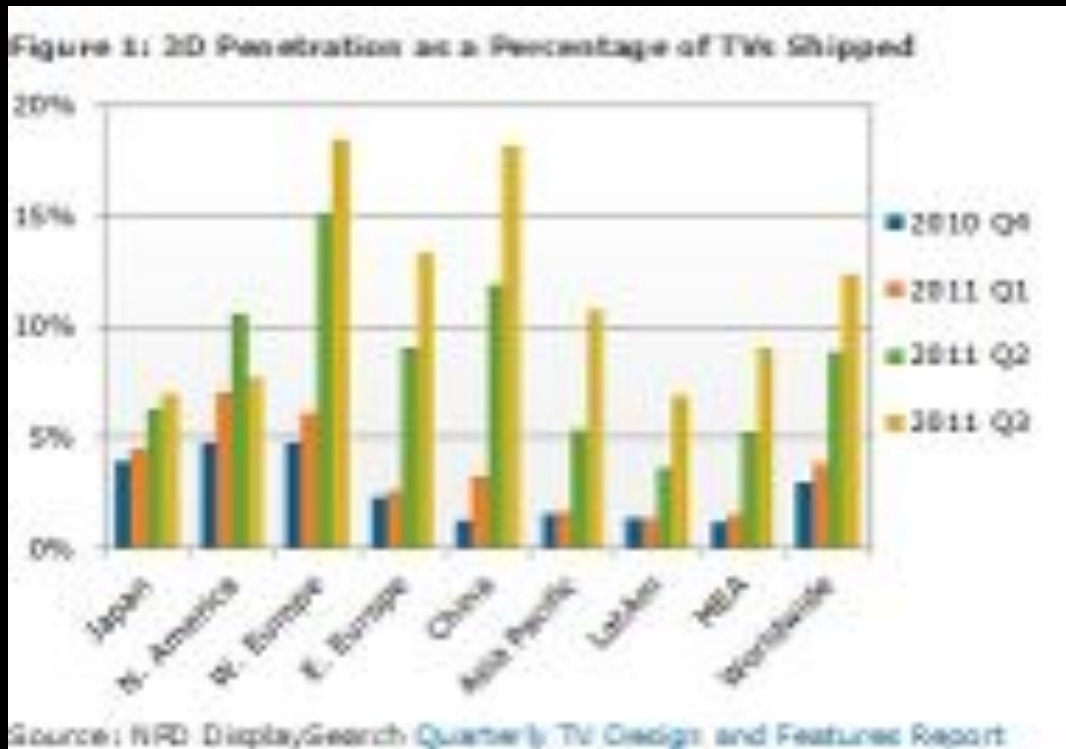
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# 3D TV Market Penetration Worldwide



- 3D is a far more popular feature in **China, Asia/Pacific, and the Middle East** than in North America or Canada
- 3D adoption is accelerating outside North America

(Source: DisplaySearch research report, 12/28/11)

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[http://www.studiodaily.com/main/news/headlines/Stereo-3D-Smartphone-Market-Poised-to-Explode\\_13567.html](http://www.studiodaily.com/main/news/headlines/Stereo-3D-Smartphone-Market-Poised-to-Explode_13567.html)



# Art versus Technology?

## Sony Pictures versus Sony Electronics

... This new technology is specially benefiting the display of background scenes...

Directors ... resort to creating 3D content using the technique of blurring the background to force viewers to concentrate only on the picture they so desired....

Now this issue is completely removed with the use of the new technology from Sony ...

It is therefore more a viewers ease of viewing that the TV set from Sony will be catering for, rather than the director's choice of focus. ...

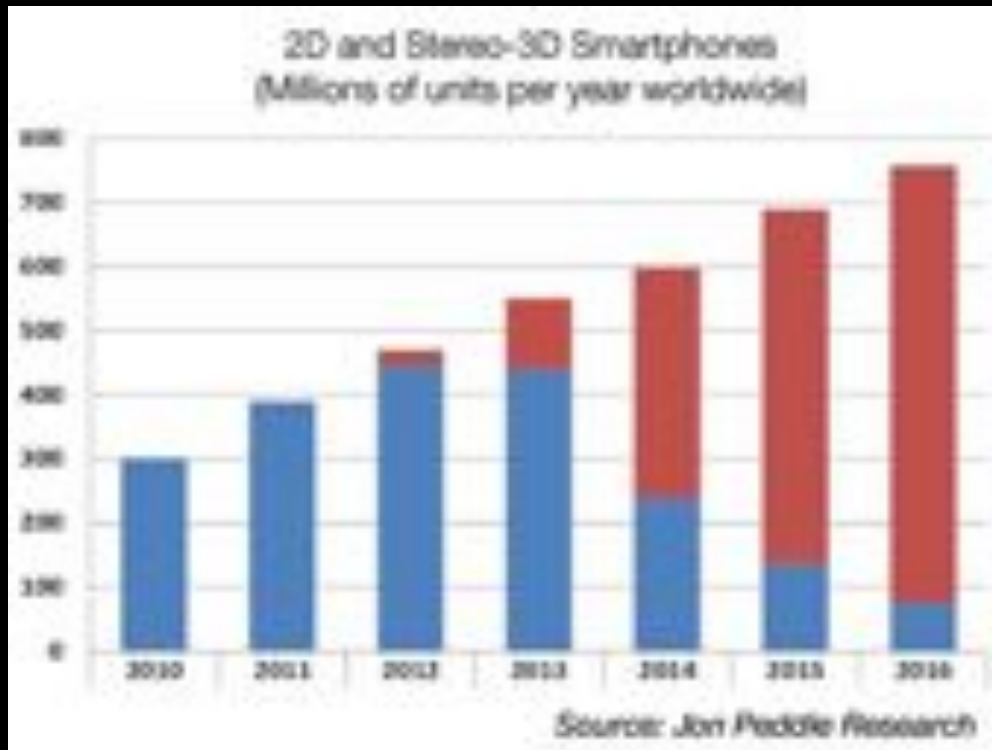
Source: <http://good3dtv.com/3d-tv/sony-introduces-new-3d-tech-to-reduce-eye-fatigue/>

# Glasses-free 3D TV



3D phones, cameras,  
Laptops, and handhelds

# Four Out of Five Handsets Will Have 3D Cameras, Screens by 2015



- 3D cameras
- 3D displays
- gesture-based interaction
- augmented reality apps

3D Tablets will also experience rapid growth

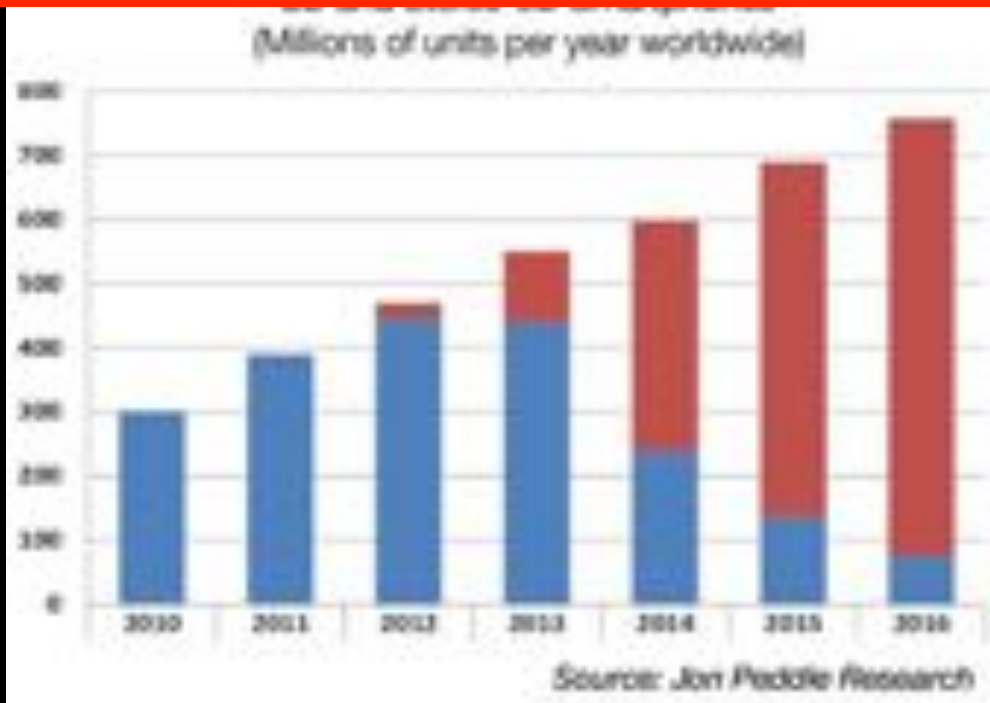
(Source: Studio Daily 12/1/11)

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Sprint discontinues HTC EVO 3D (April 22, 2012)

LG brings its second 3D phone, LG Optimus Max, to Europe (April 23, 2012)



(Source: Studio Daily 12/1/11)

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Playing  
+ sharing  
with others!

Nintendo 3DS  
first personal 3D

Augmented  
Reality  
Games



Glasses-free  
3D!

Netflix  
Short films!

3DS Autostereo screen



Kids, teens, early twenties



Adults



# Nintendo US Sales by Quarter after product introduction



Source: DigitalTrends.com, 3/7/12, How the Nintendo 3DS went from a flop to a sleeper hit

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# Autostereo Laptops

Many autostereo  
technology  
approaches



Toshiba laptop runs 3D in one window, 2D in another!  
- uses face tracking and 'active lenses'  
(Toshiba Qosmio)

# 3D head mounted displays (HMDs)



# Augmented Reality



Regal Entertainment Group teams up with Sony to bring subtitle glasses to US theaters

4/19/12



Google testing heads-up display glasses in public

4/16/12



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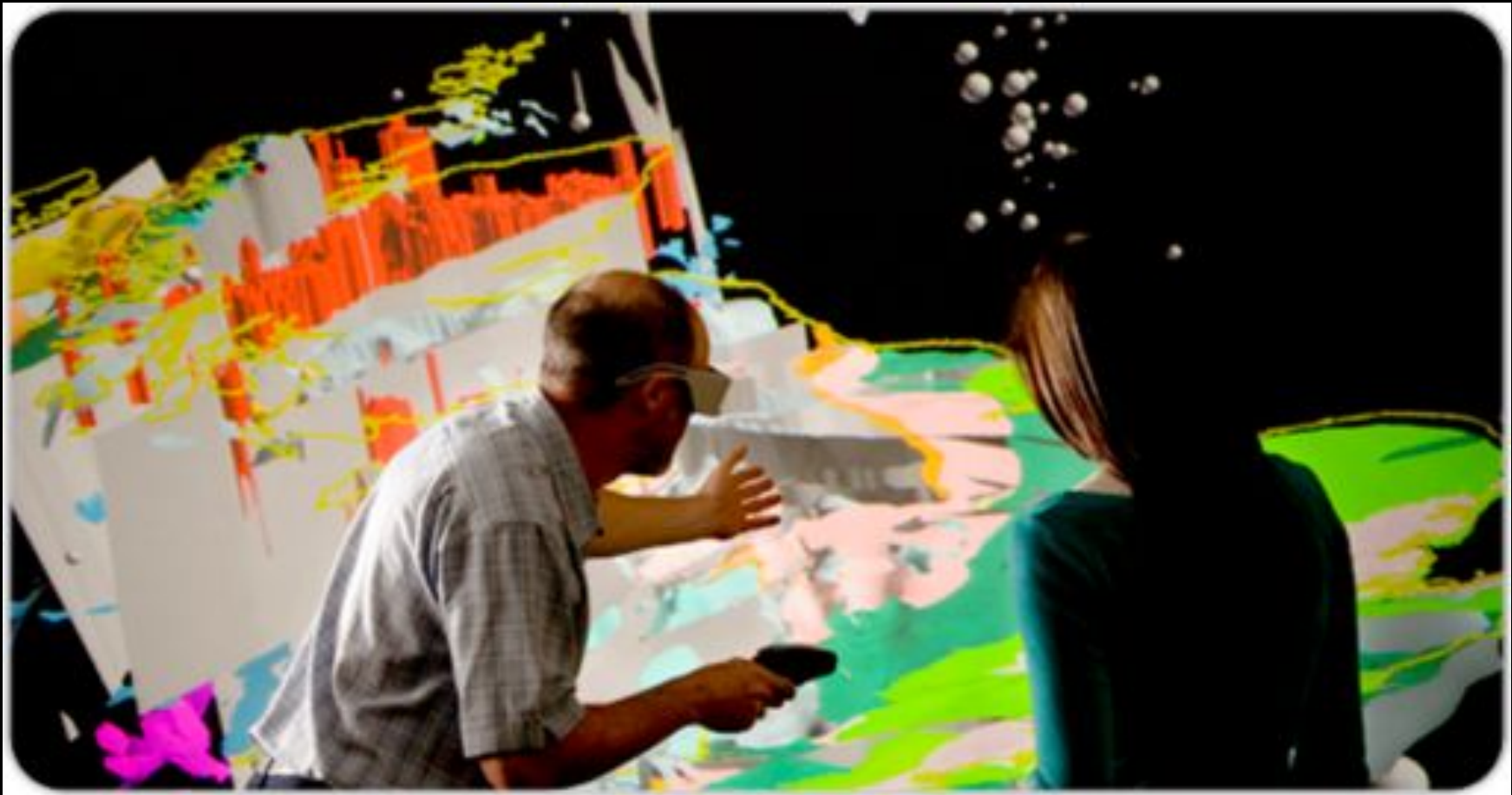
# 3D in Other Industries

# Medicine Surgery and Training





# Oil and Mineral Exploration



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# Military Training



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# Industrial Visualization and Training



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# Advertising

## YouTube 3D

“Live for Now”  
Pepsi global campaign  
Nicki Minaj  
(5/9/12)



# In-Store Marketing

*No Display*



*2D Display*



*3D Display*



# Education





# Augmented Reality Training



## Entertainment

# ‘Live Park,’ World’s First 4D Avatar Theme Park, is a Success in Korea

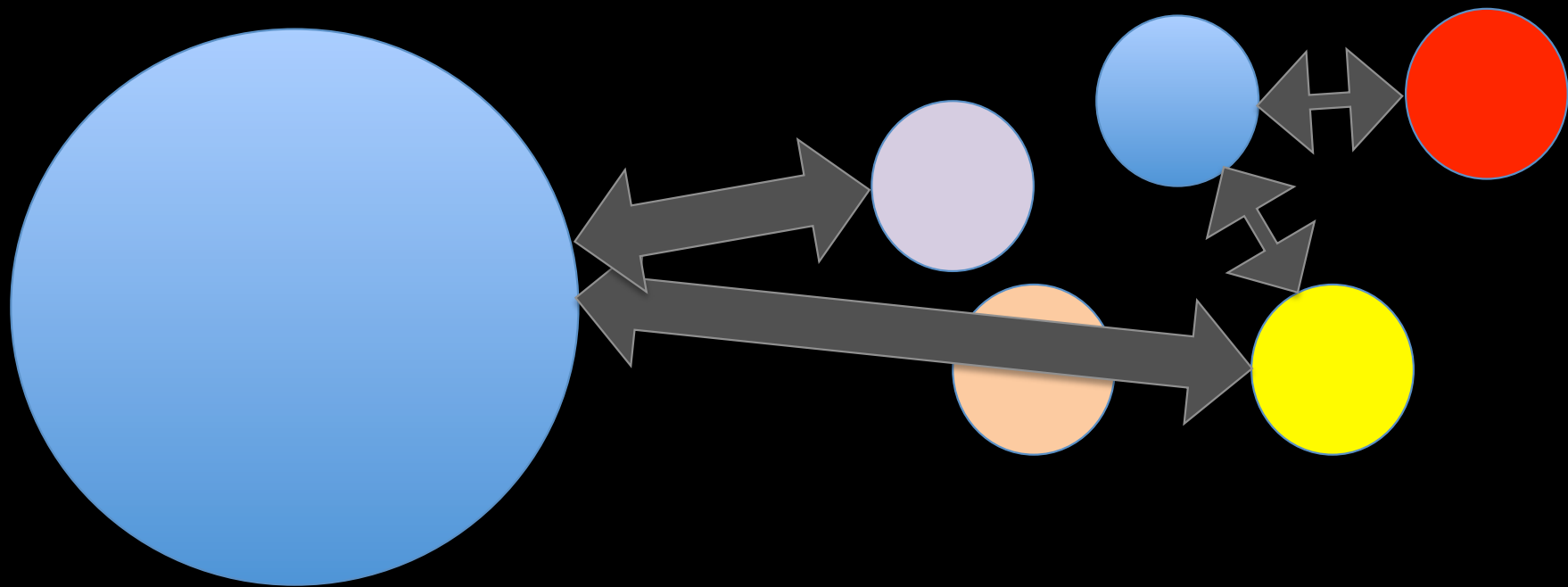


- Composed of 65 attractions over 7 thematic stages
- Uses state of the art 3D video, holograms and augmented reality technology to create a seamless story

# Evolution of 3D?

Mass Market

Niche Markets

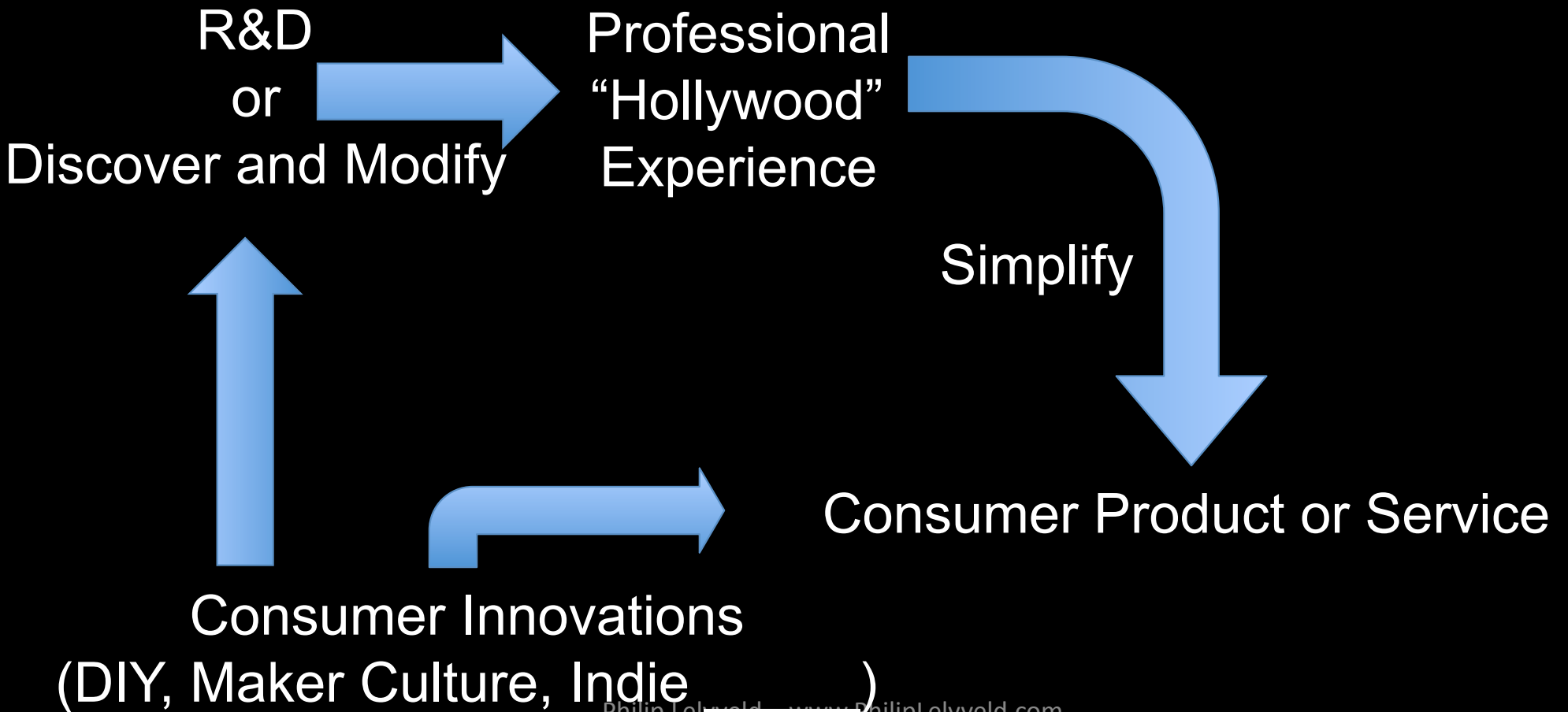


Technology development jumps industries

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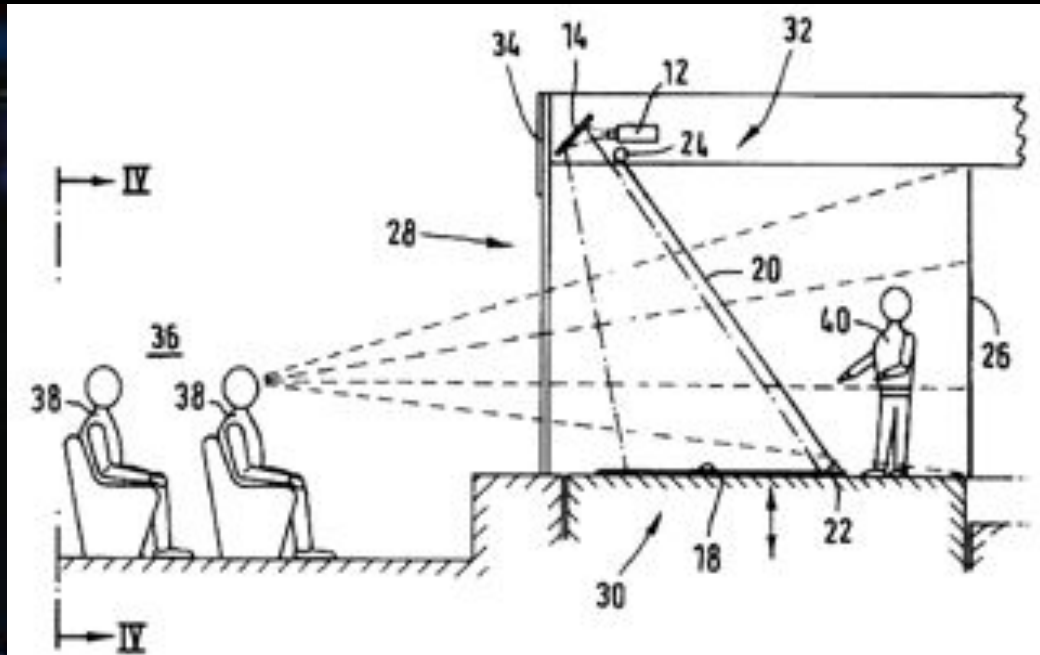
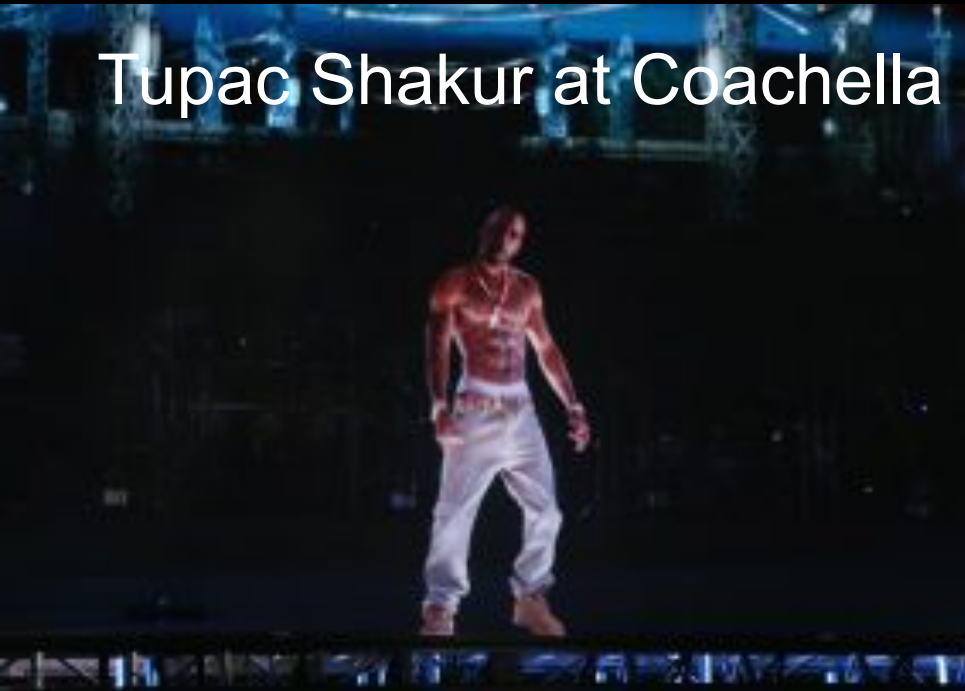


# Evolution of Entertainment [Technology] Experiences



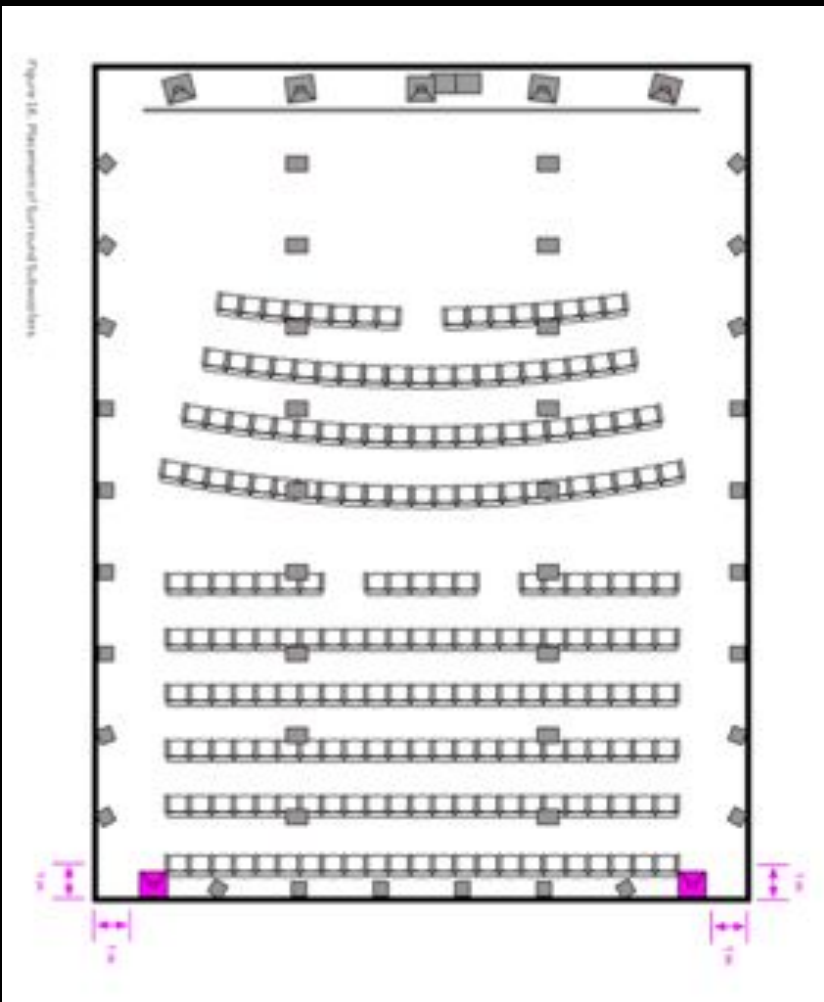
# Special Effects

Tupac Shakur at Coachella



Patent 5,865,519: Device for displaying moving images in the background of a stage, filed July 7, 1997

# 3D Audio



Source: Film Journal 4/19/12,  
and Dolby website

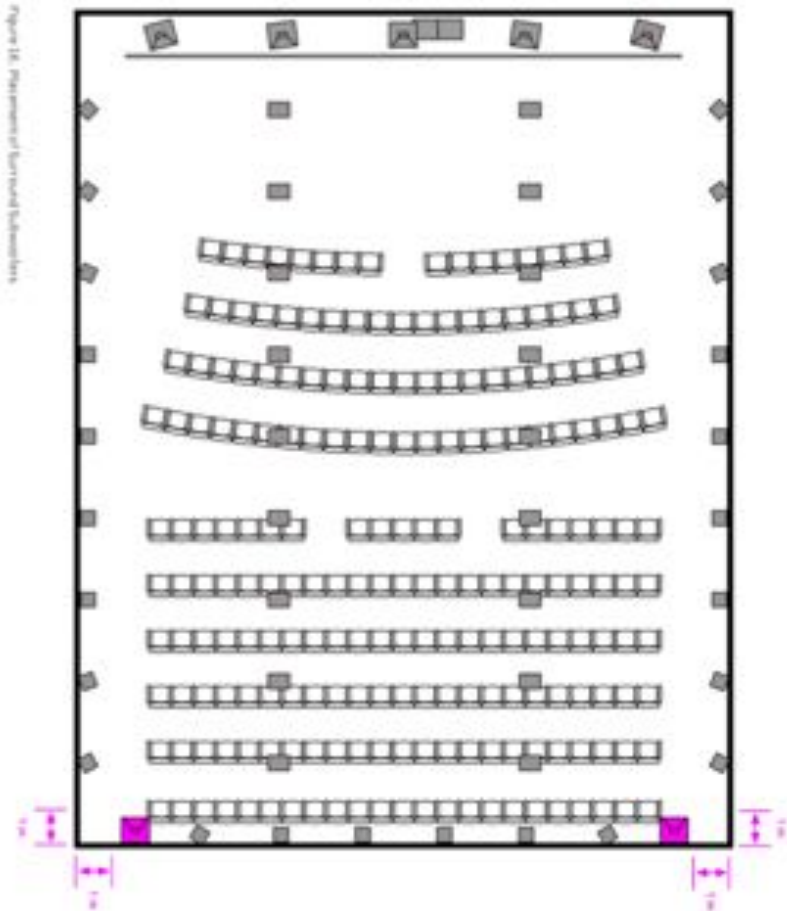
## 3D Audio

### Hemisphere of Sound

Recognizes the subconscious's ability to determine the origin of a sound without necessarily seeing the physical occurrence

### Dolby 3 layer approach

- ❖ lower horizontal layer
- ❖ height layer
- ❖ directly overhead



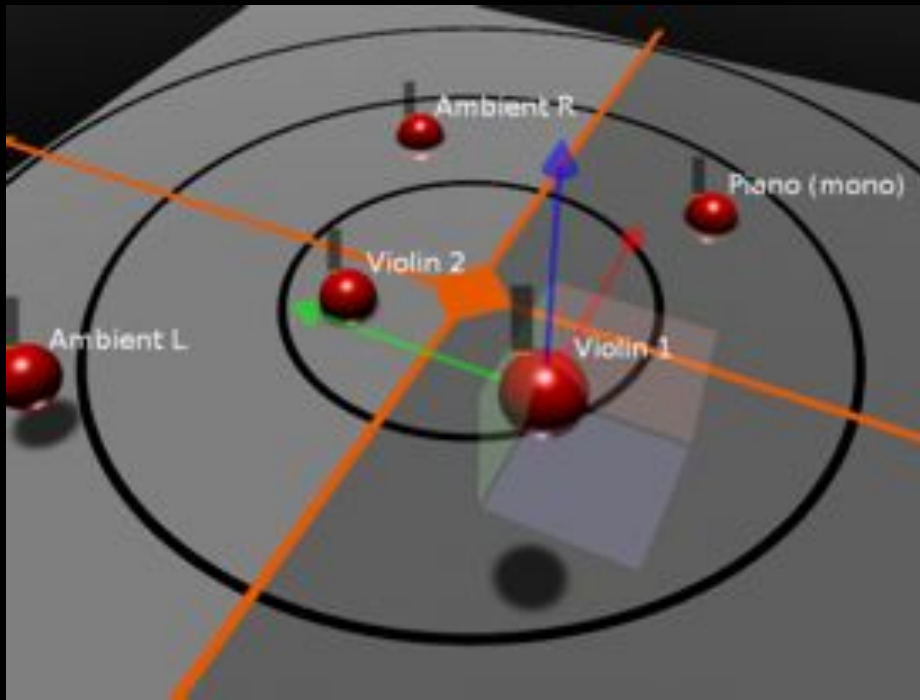
Source: Film Journal 4/19/12,  
and Dolby website

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Dolby Atmos  
10-15 theatres worldwide for  
Pixar's Brave in June, 2012

Dolby Theater  
Source: WSJ 5/10/12



## Spatial 3D Audio

- ❖ Specific sound placement in 3D (up, down, behind, distant spot, ...)
- ❖ Google “3D audio shaking match box”
- ❖ ‘You MUST wear headphones’ (sweet spot)

# 3D Printing

# 3D Printers

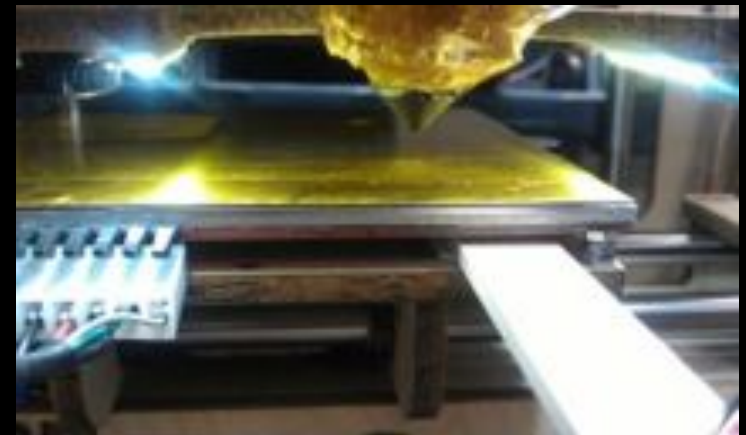
A digital file could be a...

- Song
- Book or movie
- Action figure, product, or drug

- Copyright
- Patent
- Trademark



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# Personalized Superhero Action Figures



Just send two photos  
and £80



Source: Pocket-Lint.com, May 4, 2012

<http://www.pocket-lint.com/news/45554/personalised-superhero-action-figure-3d-printing>

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# Global 3D Technology, Products and Applications Market worth **\$227.27 Billion by 2016**

Technology	Products	Applications
<ul style="list-style-type: none"><li>• <b>Stereoscopy</b></li><li>• <b>Auto-Stereoscopy</b></li><li>• Volumetric</li></ul>	<ul style="list-style-type: none"><li>• 3D IC</li><li>• 3D Printer</li><li>• <b>3D Display</b><ul style="list-style-type: none"><li>• HMD</li><li>• 3D Smartphone</li><li>• 3D TV</li></ul></li><li>• 3D Digital Signage</li></ul>	<ul style="list-style-type: none"><li>• <b>3D Animation</b></li><li>• 3D Printing</li><li>• 3D Medical Imaging</li><li>• 3D CAD</li><li>• <b>3D Gaming</b></li><li>• <b>3D Cinema</b></li></ul>

Consumers don't buy technology,  
they buy the **experiences** that  
technology delivers





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**Thank You**



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