Convergence of 4k UHD TV Adoption & the Streaming Video Era

November 2018
Three pillars of a 4k streaming future

4k UHD TV adoption
...exited the early adopter stage and is quickly penetrating the living room

Fast, reliable broadband
...and mesh routers are enabling 4k video streaming and quicker downloading

100s of 4k titles available
...benefit UHD TV owners who are more likely to be digital video users
4k UHD TV adoption exited the early adopter stage & is quickly penetrating the living room
Over four-in-ten say they are likely to use a 4k UHD TV

Consumer interest spikes to well over half of Millennials age 18-34

4k UHD TV “Very/Somewhat Likely to Use”
(August ’18)

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Men</th>
<th>Women</th>
<th>18-34</th>
<th>35-54</th>
<th>55+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>42%</td>
<td>45%</td>
<td>40%</td>
<td>56%</td>
<td>44%</td>
<td>32%</td>
</tr>
</tbody>
</table>

Source: Connected Intelligence, Device Ownership Trends & Profile Report
4k UHD TVs reached an early majority customer base

August ‘18, % of U.S. internet HHs

Source: Connected Intelligence, Device Ownership Trends & Profile Report
Over 1 in 10 (13%) living room TVs are 4k UHD

TVs Installed in Living Rooms
(August ’18)

Source: Connected Intelligence: TV Ownership Trends Report
Migration to 4k UHD
Is driving up the size of installed TVs

Installed TV Screen Size in Inches
(August ’18)

SD TV: 36
HD TV: 44
4k UHD TV: 54

Source: Connected Intelligence, Device Ownership Trends & Profile Report
50”, 55” and 65” displays dominate 4k UHD TV sales

4k UHD TV Unit Sales by Size
(YTD-September 2018)

- 55” class, 36%
- 65” class, 19%
- 60” class, 3%
- 70”+ class, 6%
- 40” class, 15%
- 50” class, 21%

Source: The NPD Group/Retail Tracking Service
Fast, reliable broadband and mesh routers are enabling 4k video streaming and quicker downloading.
63% of 4k UHD TV HHs have enough bandwidth to stream video in 4k

Some services support 4k streaming at 15-24Mbps, increasing the HH base

Source: Connected Intelligence, Device Ownership Trends & Profile Report
4k streaming capable HHs are reaching an early majority

August ‘18, % of U.S. internet HHs

- **Innovators**: 2.5%
- **Early Adopters**: 13.5%
- **Early Majority**: 34%
- **Late Majority**: 34%
- **Laggards**: 16%

4k TV Homes, 20%
4k Streaming Capable, 13%

Source: Connected Intelligence, Device Ownership Trends & Profile Report
Mesh is installed in 2m homes & unit sales are up 63% Y/Y in Q3

Mesh enables better streaming, 4k & faster digital video downloads

Mesh Router System Unit Sales

<table>
<thead>
<tr>
<th></th>
<th>Mesh Wi-Fi System Unit Sales</th>
<th>Mesh as a % of router unit sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 '16</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Q2 '16</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Q3 '16</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Q4 '16</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>Q1 '17</td>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
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<td>11%</td>
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</tr>
<tr>
<td>Q2 '18</td>
<td>23%</td>
<td>23%</td>
</tr>
<tr>
<td>Q3 '18</td>
<td>27%</td>
<td>27%</td>
</tr>
</tbody>
</table>

Source: NPD Retail Tracking Service
Major brands entered the retail market & ISPs are now distributing mesh systems

Mesh Router System Unit Share

Start-up

Big brands

ISPs

- Other
- eero inc.
- Linksys
- NETGEAR
- Google

May ’18, Comcast xFi Pods launched nationwide

Source: NPD Retail Tracking Service
100s of 4k titles available benefit UHD TV owners who are more likely to be digital video users
4k UHD TV users are more likely to buy and rent videos

### 4k UHD TV User’s Video Purchase & Rental Behavior
(Incidence of Activity, August ‘18)

<table>
<thead>
<tr>
<th>Service</th>
<th>4k TV Users</th>
<th>U.S. internet Pop</th>
</tr>
</thead>
<tbody>
<tr>
<td>BD purchased/own</td>
<td>24%</td>
<td>18%</td>
</tr>
<tr>
<td>iVOD</td>
<td>23%</td>
<td>14%</td>
</tr>
<tr>
<td>EST</td>
<td>22%</td>
<td>12%</td>
</tr>
<tr>
<td>cVOD</td>
<td>13%</td>
<td>8%</td>
</tr>
</tbody>
</table>

*Source: Connected Intelligence, Device Ownership Trends & Profile Report*
Hundreds of 4k UHD titles are available to buy and rent

- 576 4k UHD titles available to purchase or pre-buy digitally*
- 418 4k UHD titles have been available to rent digitally since inception*
- 415 4k UHD titles available to rent on-demand from DirecTV**
- 424 4k UHD BD titles have been available to buy since inception***

* Source: Warner Bros. as of 10/22/18  
** Source: AT&T as of 10/25/18  
***Source: NPD Videoscan as of 10/20/18
The future is airing in ultra-high definition

4k UHD streaming video is reaching an early majority audience that is engaged with digital video

<table>
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<th>Percentage</th>
<th>Description</th>
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<tr>
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<td>of homes are 4k UHD streaming capable</td>
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<tr>
<td>50”–65”</td>
<td>is the new living room TV size bringing benefit to 4k UHD content</td>
</tr>
<tr>
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<td>of 4k UHD titles are available to buy and rent</td>
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