



Streaming Media: The Ultimate Threat to NAND

Don Barnetson, Cofounder
DDT Software, Inc.

What do we need all this NAND for?



2011: 8.1GB
2014: 22.2GB*



2011: 35.6GB
2014: 64.9GB*

What do we need all this NAND for?

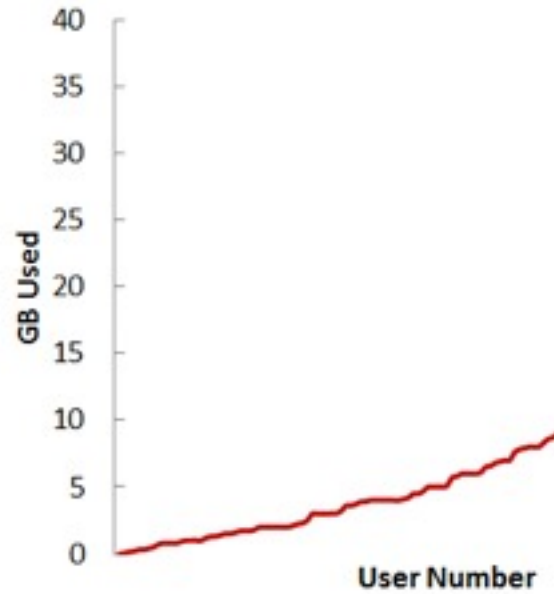


2011: 8.1GB
2014: 22.2GB*



2011: 35.6GB
2014: 64.9GB*

Smartphone Memory Use Survey Q2/11+



What do we need all this NAND for?

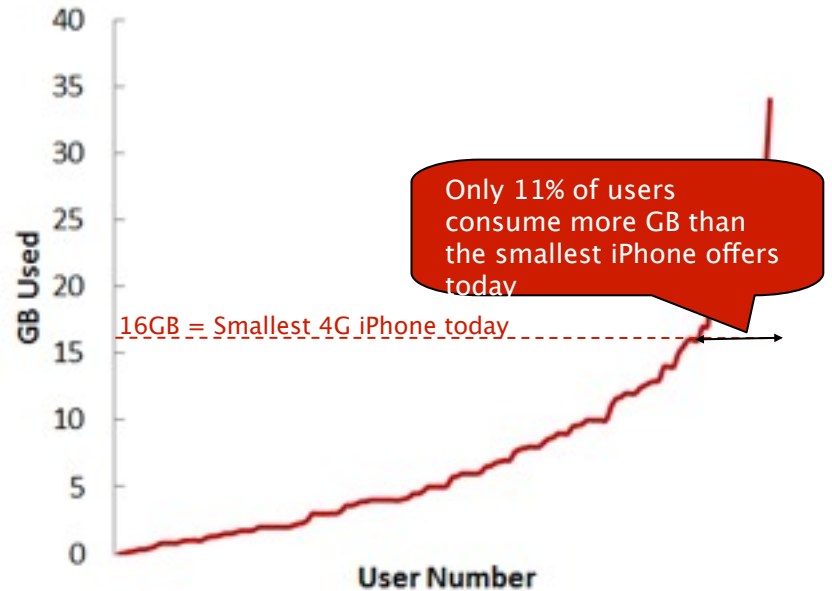


2011: 8.1GB
2014: 22.2GB*



2011: 35.6GB
2014: 64.9GB*

Smartphone Memory Use Survey Q2/11+



What do we need all this NAND for?

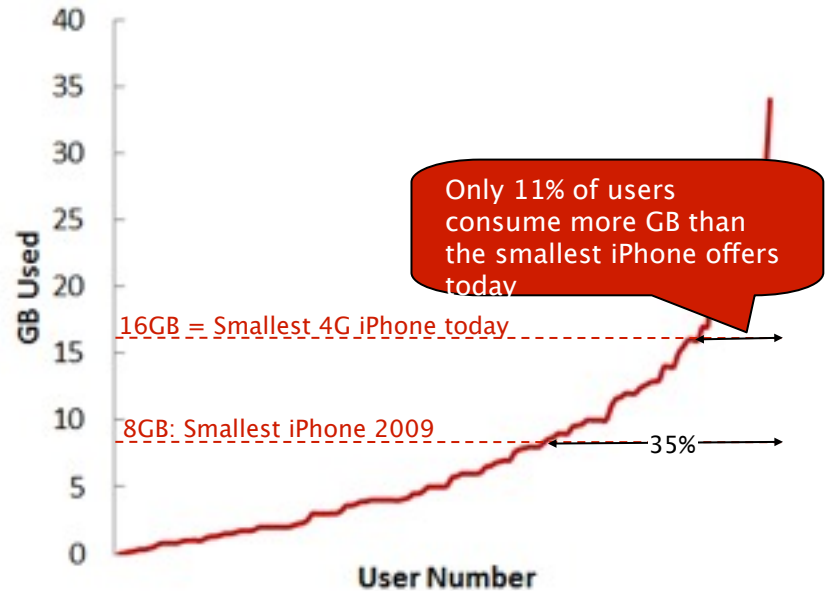


2011: 8.1GB
2014: 22.2GB*



2011: 35.6GB
2014: 64.9GB*

Smartphone Memory Use Survey Q2/11+



What do we need all this NAND for?

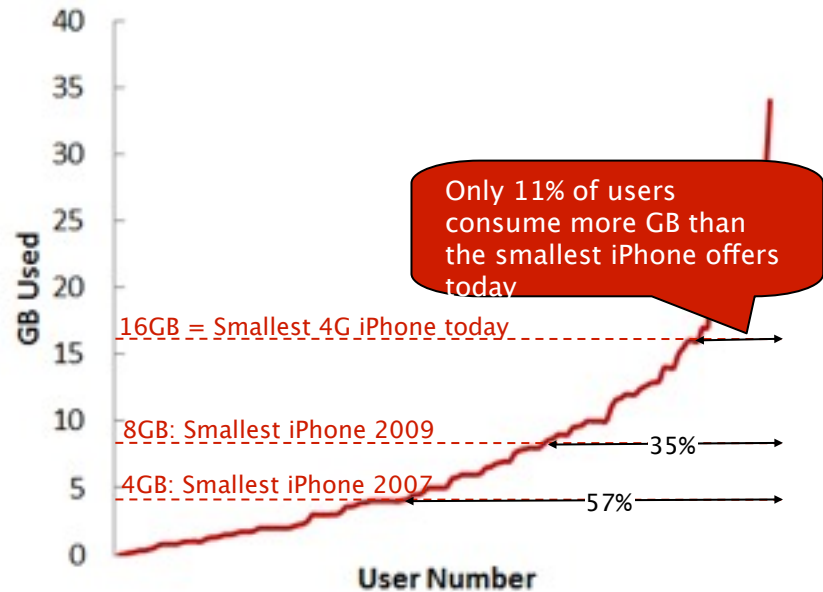


2011: 8.1GB
2014: 22.2GB*



2011: 35.6GB
2014: 64.9GB*

Smartphone Memory Use Survey Q2/11+



What do we need all this NAND for?

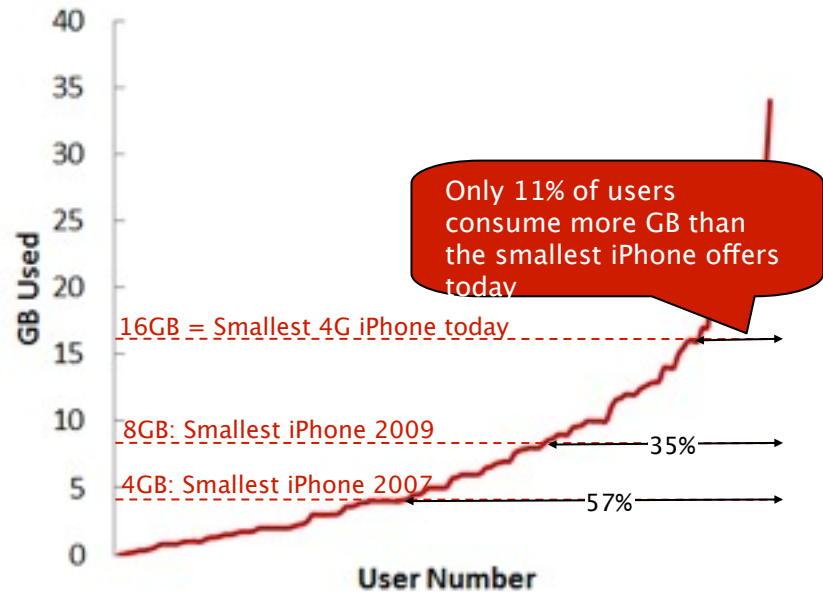


2011: 8.1GB
2014: 22.2GB*



2011: 35.6GB
2014: 64.9GB*

Smartphone Memory Use Survey Q2/11+



Postulation: Need for NAND in Smartphones and Tablets is small and may actually be **falling** in absolute



Digital Content: Owned -> Streamed

COMPACT
disc 1999
DIGITAL AUDIO \$14.6B

% of Peak Mkt Size

\$2.7B

Flash Memory Summit 2011
Santa Clara, CA



Digital Content: Owned -> Streamed

COMPACT
disc 1999
DIGITAL AUDIO \$14.6B



% of Peak Mkt Size

\$2.7B

Flash Memory Summit 2011
Santa Clara, CA



Digital Content: Owned -> Streamed

COMPACT
disc 1999
DIGITAL AUDIO \$14.6B



% of Peak Mkt Size

\$2.7B

Flash Memory Summit 2011
Santa Clara, CA



Digital Content: Owned -> Streamed

COMPACT disc 1999
DIGITAL AUDIO \$14.6B



% of Peak Mkt Size

Many casual music listeners
no longer purchase **any**
music
Stream it all for free

\$2.7B



Digital Content: Owned -> Streamed



2006
\$14B



% of Peak Mkt Size

2010
\$4.5B



Digital Content: Owned -> Streamed



2006
\$14B



% of Peak Mkt Size

2010
\$4.5B



Digital Content: Owned -> Streamed



2006
\$14B



% of Peak Mkt Size

2010
\$4.5B

Digital Content: Owned -> Streamed



File Sharing
% of Internet Traffic

% of Peak Mkt Size

Digital Content: Owned -> Streamed



% of Peak Mkt Size

File Sharing
% of Internet Traffic

Owned Content is being replaced by Streamed Content
Streamed Content requires no local storage



Streaming exceeds Content Download 100:1

iTunes Store Represents >70% of WW Content Store Market



Music

~3B Songs/year @ 4MB/ea = 12PB
5 hours of NAND Industry production



Streaming exceeds Content Download 100:1

iTunes Store Represents >70% of WW Content Store Market



Music

~3B Songs/year @ 4MB/ea = 12PB
5 hours of NAND Industry production



~50B songs streamed in US in
2010

Streaming exceeds Content Download 100:1

iTunes Store Represents >70% of WW Content Store Market



Music

~3B Songs/year @ 4MB/ea = 12PB
5 hours of NAND Industry production



~50B songs streamed in US in
2010



Video

~100M Hours/year @ ~1GB/hr = 100PB
36 hours of NAND Industry production

Streaming exceeds Content Download 100:1

iTunes Store Represents >70% of WW Content Store Market



Music

~3B Songs/year @ 4MB/ea = 12PB
5 hours of NAND Industry production



Video

~100M Hours/year @ ~1GB/hr = 100PB
36 hours of NAND Industry production



~50B songs streamed in US in
2010



~1.5B hours streamed 2010



100M hours/month...
...and growing fast.



800M hours/month

Streaming exceeds Content Download 100:1

iTunes Store Represents >70% of WW Content Store Market



Music

~3B Songs/year @ 4MB/ea = 12PB
5 hours of NAND Industry production



~50B songs streamed in US in
2010



Video

~100M Hours/year @ ~1GB/hr = 100PB
36 hours of NAND Industry production



~1.5B hours streamed 2010



100M hours/month...
...and growing fast.



Apps

Apps <20MB to for over-the-air distribution
~12B Apps/year @ ~4MB/app = 48PB
18 hours of NAND Industry Production



800M hours/month

Streaming exceeds Content Download 100:1

iTunes Store Represents >70% of WW Content Store Market



Music

~3B Songs/year @ 4MB/ea = 12PB
5 hours of NAND Industry production



~50B songs streamed in US in
2010



Video

~100M Hours/year @ ~1GB/hr = 100PB
36 hours of NAND Industry production



+5 ~1.5B hours streamed 2010



100M hours/month...
...and growing fast.



Apps

Apps <20MB to for over-the-air distribution
~12B Apps/year @ ~4MB/app = 48PB
18 hours of NAND Industry Production



800M hours/month

iTunes Store consumes only 2.5 days of NAND Production; streaming >100x larger
Postulation: Requirement for local storage appears to be declining in **absolute** terms

Streaming on Mobile? Not so fast...

Say Goodbye to Unlimited Data Plans

By [RICK ARISTOTLE MUNARRIZ](#)

Posted 4:00PM 08/03/11 | [Company News](#), [Technology](#), [Sprint Nextel Corp.](#), [Apple](#), [AT&T](#), [Verizon](#), [Consumer Ally](#)

[Comments](#)

Text Size [A](#) [A](#) [A](#)



Unlimited data isn't as unlimited as it used to be.

AT&T (T) advised wireless customers on unlimited data plans over the weekend that it plans to begin slowing down its most active smartphone owners.

Come October, customers among the top 5% of AT&T's data users in any given billing period [will be subjected to](#)



Reed Saxon, AP

Streaming on Mobile? Not so fast...

Say Goodbye to Unlimited Data Plans

By [RICK ARISTOTLE MUNARRIZ](#)
 Posted 4:00PM 08/03/11 | [Company News](#), [Technology](#), [Sprint Nextel Corp.](#), [Apple](#), [AT&T](#), [Verizon](#), [Consumer Ally](#)

Comments | Text Size [A](#) [A](#) [A](#) | [Print](#) | [Email](#) | [Facebook](#) | [Twitter](#) | [LinkedIn](#) | [Google+](#)




Unlimited data isn't as unlimited as it used to be.

AT&T (T) advised wireless customers on unlimited data plans over the weekend that it plans to begin slowing down its most active smartphone owners.

Come October, customers among the top 5% of AT&T's data users in any given billing period [will be subjected to](#)




Reed Saxon, AP




Carrier	MNO \$/GB	Netflix \$/hr
	\$10/GB	\$2.50/hr
	\$10/GB	\$2.50/hr
	\$15/GB	\$3.75/hr

Streaming on Mobile? Not so fast...

Say Goodbye to Unlimited Data Plans
By [RICK ARISTOTLE MUNARRIZ](#)




Rebuffering...




Carrier	MNO \$/GB	Netflix \$/hr
	\$10/GB	\$2.50/hr
	\$10/GB	\$2.50/hr
	\$15/GB	\$3.75/hr

Streaming on Mobile? Not so fast...

Say Goodbye to Unlimited Data Plans
By [RICK ARISTOTLE MUNARRIZ](#)






Rebuffering...

Carrier	MNO \$/GB	Netflix \$/hr
	\$10/GB	\$2.50/hr
	\$10/GB	\$2.50/hr
	\$15/GB	\$3.75/hr

Steaming Video on Mobile – what a deal:

Streaming on Mobile? Not so fast...



Carrier	MNO \$/GB	Netflix \$/hr
	\$10/GB	\$2.50/hr
	\$10/GB	\$2.50/hr
	\$15/GB	\$3.75/hr

Steaming Video on Mobile – what a deal:

- High cost, low quality...what an opportunity for NAND

Our Solution: Empower the Consumer

Leverage content you already pay for – enable anywhere, anytime access



1975 - \$2,295



1999 - \$500+\$19.95/month



2004 - \$15.95/month



Our Solution: Empower the Consumer

Leverage content you already pay for – enable anywhere, anytime access



1975 - \$2,295



1999 - \$500+\$19.95/month



2004 - \$15.95/month



2011 - \$Free

Our Solution: Empower the Consumer

Leverage content you already pay for – enable anywhere, anytime access



1975 - \$2,295



1999 - \$500+\$19.95/month



2004 - \$15.95/month



2011 - \$Free

Private Beta on the first free Streaming Media DVR

- Enable the consumer to store the world of streaming media for offline consumption on mobile devices

Will consume 10-16GB - equiv. to 3200 "Apps"
@12M users, more NAND than iTunes Store