

# CONTAINING THE CONTENT EXPLOSION: THE CASE FOR CLOUD



**HIGHLIGHTING THE IMPLICATIONS AND PRESENTING THE SOLUTIONS FOR CONSUMERS, DEVICE MANUFACTURERS AND OPERATORS**

*EVER SINCE THE LAUNCH OF THE FIRST IPHONE IN JUNE 2007 CONSUMERS HAVE GENERATED INCREASINGLY LARGE VOLUMES OF PERSONAL CONTENT. THE EVOLUTION IN DEVICE CAPABILITIES, NETWORK SPEEDS AND CAPACITY ARE DRIVING THE CREATION, SHARING AND CONSUMPTION OF RICHER AND 'HEAVIER' USER CONTENT — VIDEOS, PHOTOS, MUSIC, APPS ETC. THIS TREND IS SET TO CONTINUE AT AN EXPONENTIAL PACE, CREATING A MULTITUDE OF CHALLENGERS FOR MOBILE CARRIERS.*

But what does 'exponential' mean in this context? How much content are consumers creating, sharing, consuming and storing? At what rate is this increasing? And what specific challenges does this cause for mobile carriers?

For the first time, this paper attempts to chart the velocity of the on-going content explosion and answer some of these critical questions.

**A typical 16GB iPhone 6 could be full in less than two months from now**

## **MORE (AND MORE AND MORE) MOBILE CONTENT**

Insights from a new 451 Research study focusing on consumer behaviour in the US, and the analysis of proprietary Synchronoss data, covering more than 30 million mobile subscribers, reveals for the first time the magnitude of the explosion in mobile content.

In the ten month period between April 2015 and January 2016, Synchronoss tracked/monitored/witnessed the following trends amongst the users of its Synchronoss' Personal Cloud platform:

- The average amount of user content created and stored per subscriber increased by 55%, an average month-on-month increase of approximately 5%

- The average number of videos created and stored per subscriber grew by 62% (average of 14 videos per person increased to 22)
- The average number of images created and stored per subscriber increased 48% (average of 518 images per person grew to 769 per person)

Additionally, according to the Synchronoss-commissioned 451 Research study, 'The Personal Mobile Content Explosion', conducted in January 2016, the average US smartphone user:

- Uses up, on average, 10.8GB of storage capacity on their device (see table below) with the major offenders being:
  - Photos (take up 3.6GB on average)
  - Videos (take up 3.7GB)
  - Apps (take up 900MB)
- Is expected to increase the net amount of content stored by approximately 8% per month (911MB)

By combining both the 451 Research and proprietary Synchronoss datasets to get an overall combined view, Synchronoss estimates the amount of customer content created and stored to conservatively increase at more than 6% per month. At this rate, a typical iPhone 6 16GB device (that has 12GB of general capacity available for content storage) could be full in less than two months from now.

# PERSONAL CONTENT STORAGE OF A TYPICAL MOBILE USER

<b>CONTACTS</b>	<b>300</b>
Growth rate	3 per month
<b>PHOTOS</b>	<b>750</b>
Growth rate	19 per month
Average file size	4.8 MB
Storage required/Monthly increment	3.6 GB/91 MB
<b>VIDEOS</b>	<b>10</b>
Average length	3 minutes
Growth rate	2 per month
Average file size	124 MB
Storage required/Monthly increment	3.7 GB/744 MB
<b>SONGS</b>	<b>150</b>
Growth rate	4 per month
Average file size	4 MB
Storage required/Monthly increment	600 MB/16 MB
<b>APPS</b>	<b>30</b>
Growth rate	2 per month
Average file size	30 MB
Storage required/Monthly increment	900 MB/60 MB
<b>OTHER (WORD DOCS, PDFS, PODCASTS, ETC.)</b>	<b>2 GB</b>
<b>TOTAL STORAGE REQUIRED</b>	<b>10.8 GB</b>
<b>ESTIMATED TOTAL MONTHLY INCREMENT</b>	<b>911 MB</b>

Putting aside the impact of this volume of content on network capacity, this exponential rise in content presents huge challenges for carriers in helping their customers manage their valuable content.

## WHAT'S DRIVING THE CONTENT EXPLOSION?

### PHOTOS

It comes as little surprise that photos are at the heart of the content explosion. The popularity of Facebook, Instagram, Twitter, Snapchat and Flickr has fuelled a vast image sharing culture amongst mobile subscribers. Device manufacturers have invested time and money to increase the capabilities of on-device cameras. While 8 megapixel cameras used to be the norm, the Samsung Galaxy S6 currently boasts a 16 megapixel camera, the Sony Xperia Z5 camera has 23 megapixels and the Nokia Lumia 1020 boasts a whopping 41 megapixel device.

What is also interesting is that, according to 451 Research, while mobile consumers have the opportunity to conserve storage space by taking pictures at a lower resolution, most don't. In fact, 92% of consumers surveyed by 451 Research shoot photos in the highest setting – quite often the default. This creates large images – on average a 16-megapixel photo takes up about 4.8MB of storage. An average user stores approximately 750 photos on their smartphone – this equates to roughly 3.6GB of storage, or one quarter of the available file storage on an iPhone 6 16GB device. If the average consumer takes and stores a net 19 photos per month, their storage requirement increases by 91MB per month.

This is backed up by data from Synchronoss carrier customers. The average number of images per subscriber increased by 4.5% on average per month between April 2015 and January 2016 – 48% in the period.

### VIDEO

Cisco's [Visual Networking Index](#) has become the de facto source of data on mobile video consumption and its impact on networks, but video files are having a growing impact on local device storage.

File sizes vary widely depending on the type of compression used and the level of encoding. As a rough estimate, according to 451 Research, a one minute video encoded at 1080p takes up approximately 124MB of storage. If a typical mobile user has around 10 videos stored on their device, averaging three minutes each, the resulting 30 minutes of video requires 3.7GB of storage. If the average consumer stores a net two videos per month, their storage requirement increases by 124MB per month.

This is backed up by data from Synchronoss carrier customers. The average number of video's per subscriber increased by an average of 5.5% per month between April 2015 and January 2016 – 62% in the period.

APPS

According to 451 Research, most users have between 20 and 39 apps on their device. The file sizes of each of these apps are growing – the average app is roughly 20MB in size with some games requiring 60MB or more. On the basis of creating a typical user profile, 451 Research multiplied 30 apps by an average file size of 30MB to produce a total app content payload per user of 900MB.

If the average consumer downloads and keeps a net two apps per month, their storage requirement increases by 60MB per month.

This is backed up by data from Synchronoss carrier customers. The average number of apps stored per subscriber increased from 23 to 40, between April 2015 and January 2016.

AND THE TREND OF HEAVY CONTENT GENERATION, SHARING AND STORAGE WILL CONTINUE

451 Research and Synchronoss' analysis of its own proprietary customer data estimates that the amount of content stored per subscriber will increase at a rate of between 5% and 8% per month – based on historical growth rates.

In fact, and as ever, the mobile industry is on the cusp of several new innovations which will drive heavier content creation at a potentially much faster rate. 4K HD mobile video and audio, advancements in camera capability and faster device processing power will add significant weight to content payloads.

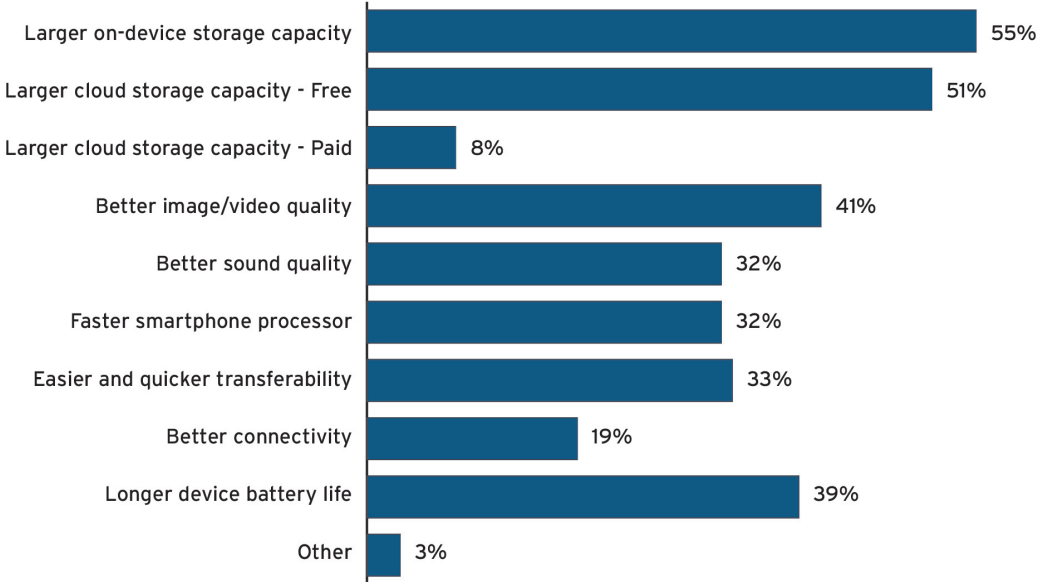
Monthly double digit increases in content creation and storage look guaranteed

But just because these innovations are available, will consumers adopt them in droves? The 451 Research data certainly suggests so:

- Better content quality will drive more content creation and storage. In particular, consumers said they would store more photos, videos and music, if the image/video quality (41%) and sound quality (32%) were better.
- Better device capabilities also drive on mobile content creation and storage. Speedier processing (32%) and more efficient file transfer (33%) will have a significant impact on consumer mobile content creation and storage.

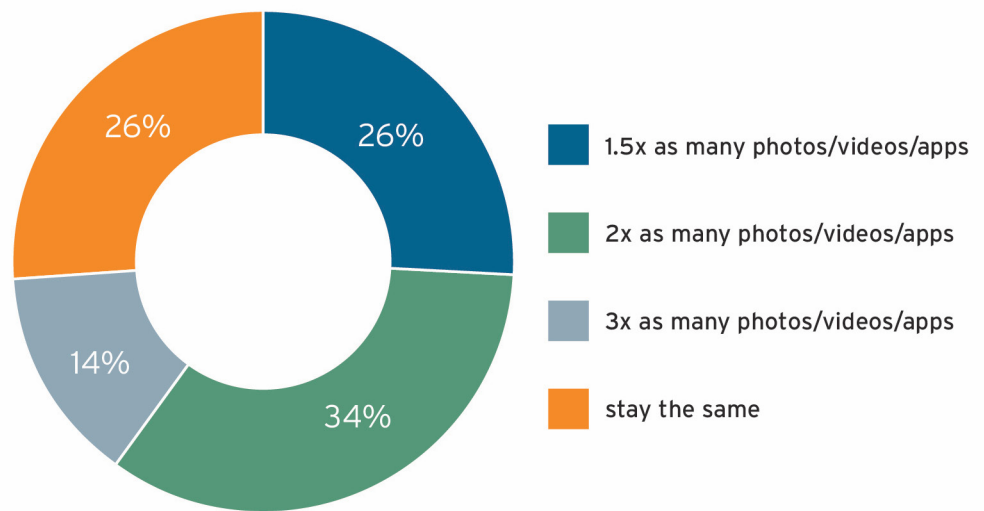
DESIRED CAPABILITY IMPROVEMENTS

Q: Which of the following capability improvements would encourage you to create/store more content (photos, videos, apps, etc.) on your smartphone? [select all that apply] (n=504)



## INCREASE IN FUTURE USE

Q: If your mobile device had the desired capability improvements (selected by you), how would that impact the current volume of content that you create/store on your smartphone? [on average] (n=504)



Importantly, it's actually increased storage capacity (more on-device storage capacity (55%) and free cloud storage capacity (51%)) that has the biggest impact on creation and storage of content.

Given these impending innovations, how will consumers behave? A quarter of consumers would expect to create and store 1.5x as much content. 14% expect their content creation and storage to treble. The majority (34%) expect to create and store three times as much content as they do today.

Bearing these trends in mind, historical growth rates of between 5% and 8% per month start to look extremely conservative. No one can accurately predict the likely impact, but monthly double digit increases in content creation and storage look guaranteed.

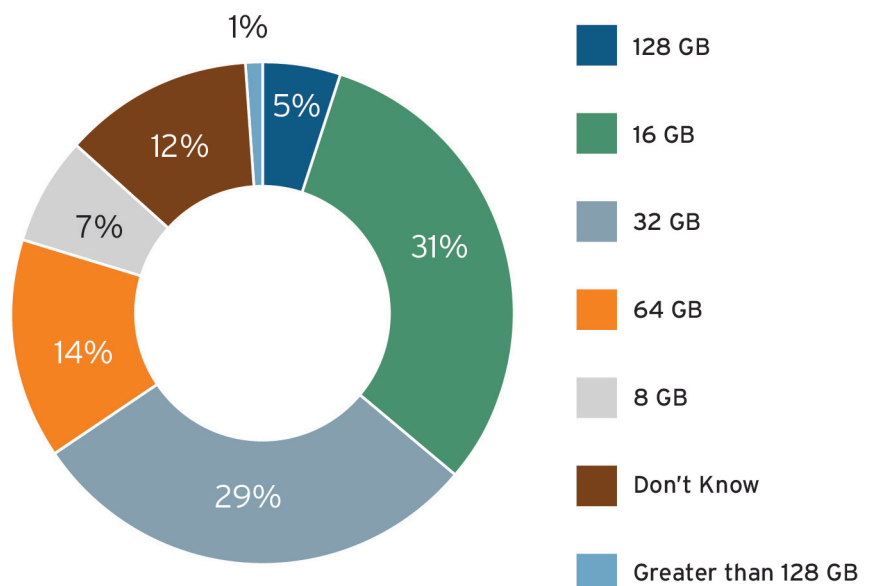
## NOWHERE FOR CONTENT TO GO: DEVICES ARE FULL OR VERY NEARLY FULL

Today's smartphones have limited storage capabilities. Obtaining extra capacity can be expensive, with most consumers making trade-offs between storage capacity and cost. According to 451 Research, in the US 57% of mobile subscribers have 32GB on-device storage available or less – the majority (31%) have just 16GB. Indeed, in the case of most smartphones, the 'true capacity' can be even less. The iPhone 6S, for example, has just 12GB available to subscribers for storage – the remaining 4GB is required for processing and enabling the device to function.

This means that, on average, mobile subscribers have very little, or no storage space at all remaining on their devices.

## SMARTPHONE STORAGE SPACE

Q: How much storage space do you have on your current smartphone? (n=504)



# SMARTPHONE SALES FORECAST (IN UNITS)

	2015		2019	
UNITED STATES				
TOTAL SMARTPHONE SALES	144.7 MILLION		157.6 MILLION	
Total In-Store Sales / % of Total Sales	85.6 million	59%	92.6 million	59%
UNITED KINGDOM				
TOTAL SMARTPHONE SALES	29.5 MILLION		30.7 MILLION	
Total In-Store Sales / % of Total Sales	16 million	54%	16.3 million	53%
FRANCE				
TOTAL SMARTPHONE SALES	26.1 MILLION		30.2 MILLION	
Total In-Store Sales / % of Total Sales	15 million	57%	17 million	56%
GERMANY				
TOTAL SMARTPHONE SALES	28 MILLION		32.1 MILLION	
Total In-Store Sales / % of Total Sales	15.7 million	56%	17.9 million	56%
ITALY				
TOTAL SMARTPHONE SALES	22.1 MILLION		23.7 MILLION	
Total In-Store Sales / % of Total Sales	12.1 million	55%	13.1 million	55%
SPAIN				
TOTAL SMARTPHONE SALES	18.2 MILLION		19 MILLION	
Total In-Store Sales / % of Total Sales	9.6 million	53%	10.1 million	53%

## THE CONTENT EXPLOSION: CARRIER IMPACT

The network implications of the content explosion – the so-called ‘capacity crunch’ – has been covered by industry commentators for years. Carriers have invested billions and billions of dollars in network upgrades in response. However, the consumer and device impact of the content explosion – and the knock-on effect of this on carriers – has received relatively little attention, which is curious given the intimate relationship consumers have with their devices and content. There are three critical reasons why carriers need to pay particularly close attention to this issue.

The first thing to remember is that carriers still dominate smartphone sales. In 2015, according to 451 Research, 65% of sales came through operators in the US. In Europe, 64% of sales in the UK, 67% in France, 62% in Germany, 51% in Italy, and 65% in Spain came through the operator channel. This is a trend that is expected to remain relatively constant over the next five years. It stands to reason, therefore, that the majority of consumers in the US and Europe will expect carriers to

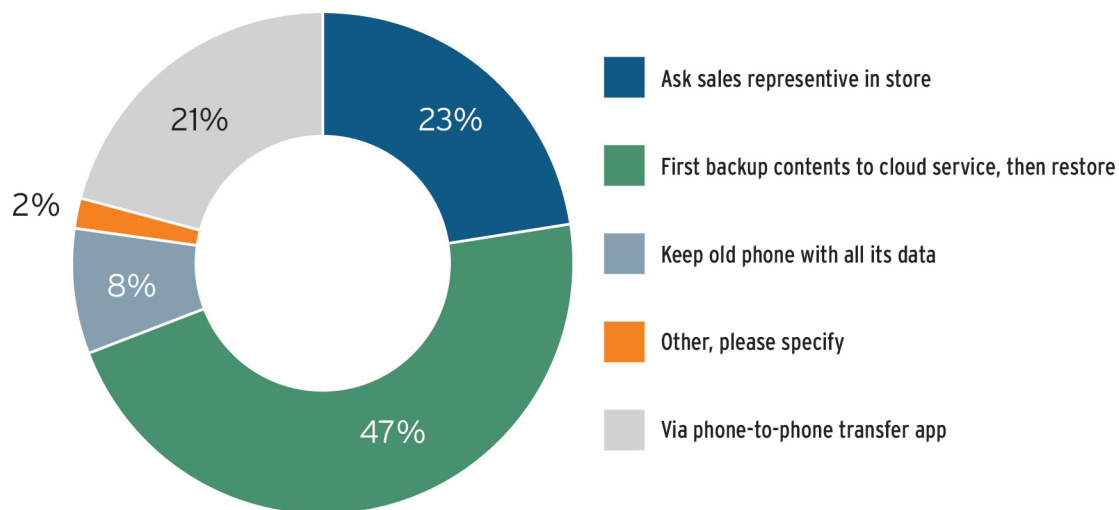
support them when it comes to the secure storage and management of their devices and content. Put another way, it is the responsibility of carriers to help consumers deal with the content explosion of their own making.

The second is that the physical retail channel is still crucial in the smartphone world as the majority of sales take place in-store – 59% between carrier-owned and carrier-independent stores in the US. In Europe, the situation is similar with a significant number of new device purchases also taking place in-store – 37% of smartphone sales in the UK, 42% in France, 38% in Germany, 33% in Italy, and 31% in Spain take place in physical retail locations.

Why is this relevant to carriers? Because the content explosion is proving significantly damaging to the in-store experience. 23% of consumers go in-store to transfer their content between old and new devices. This is a hugely time-intensive task for carriers and consumers.

# MOVING CONTENT TO NEW SMARTPHONE

Q: When upgrading/purchasing new device, how do you move your content to your new phone? (n=504)



Take this example. If the average smartphone user has 10.8GB of content and chooses to transfer this to their new device in-store, it takes approximately 60 minutes via an optimal Wi-Fi connection. Given that 19.6 million smartphones were sold in the US in the 2015 holiday period, and that 23% of Americans ask in-store reps to transfer their personal content for them, 4.5 million hours were lost by customers and sales staff performing this mundane task. That's 4.5 million hours of wasted time for consumers, 4.5 million hours of wasted time for in-store sales reps – an enormous opportunity cost.

The end of device subsidies in the US and growing popularity of operator-led 'Early Upgrade Programs' (EUPs) will see the number of device content transfers increase in the coming years. The in-store waits are therefore set to lengthen unless a solution is found.

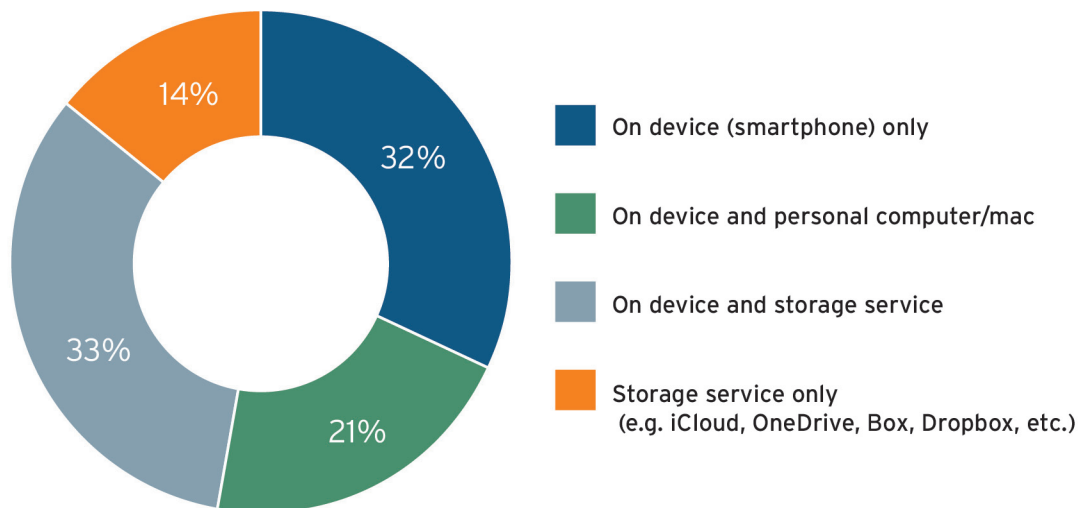
Finally, consumers are finding work-arounds that 'cut out the carrier'. Those savvy consumers that do understand the alternatives to in-store content transfer are already switching in droves. 14% of those surveyed by 451 Research exclusively use storage services from the likes of Apple, Microsoft, Box, DropBox et al to store the

photos and videos they take with their smartphones. 33% use their device and storage services. In total, 47% of consumers have addressed their own personal 'content conundrum' and are often relying on third parties to help them store and manage their content. This creates a risk that carriers could start to lose their tightly-held relationship with their subscribers.

The ability of mobile subscribers to create, store and share their own content sits at the heart of an increasingly connected life. Carriers are seen as the enablers and maintain trusted billing relationships with billions of people around the world. To sustain these relationships, they must put the infrastructure in place to securely store and provide ongoing access to this content whenever or wherever their customers need it. After all, if carriers can't support growing content payloads that result from the advancements in device and network evolution, how can they credibly sell them?

# TYPES OF STORAGE IN USE

Q: Where do you store photos and videos taken with your smartphone? (n=504)



## THE CASE FOR CLOUD

Given the storage limits on most smartphones today and the fact users eat up available on-board storage capacity very rapidly, how best to manage that storage becomes a crucial concern for carriers. And it's not just a capacity issue. Having all one's content saved purely on a device greatly increases the risk of loss – lose the phone, have it stolen or suffer a crash and all of the content on that device could be lost, and lost for good. Mobile users already understand those risks and limitations and rely heavily on storage options beyond their device to manage their personal mobile content.

However, according to 451 Research, 53% of US consumers do not currently use any form of cloud-based storage. Given that the cloud market is more advanced in the US than elsewhere, this creates an enormous opportunity for carriers around the world to help consumers manage their content.

Just as important as having access to storage beyond the mobile device, users need assistance and tools to help them move content between devices – especially as device upgrade programs increase the opportunity for more frequent phone swap-outs. The rise of cloud services for ongoing content back-up and restore functions represent an exciting opportunity for operators and cements their role at the heart of the content storage and transfer ecosystem.

451 Research summarizes the motivations for operators adopting and mobile users needing cloud back-up and restore services as follows:

- The average mobile user creates and stores about 11GB of content and creates an additional 911MB per month which can easily stress the storage limits of a typical entry-level 16GB mobile device. That forces users to stop adding or start deleting content, or seek out additional storage beyond the device.
- Technology improvements spur the creation of additional mobile content. Even more than device or content improvements, the most important advances to surveyed US smartphone users include larger mobile cloud capacity and better image/video/sound quality among others.
- Most mobile users already use off-device storage to manage their mobile content and rely on cloud storage and in-store personal help to transfer content when they upgrade to new devices.
- Industry moves away from device subsidies and service contracts, and toward device financing/leasing and frequent upgrade programs, meaning that mobile users are eligible to change devices more often than in the past. Such changes also mean that carriers need 'sticky' services to keep users from churning away to competitors since traditional mechanisms like two-year contracts and early termination fees are no longer in play.



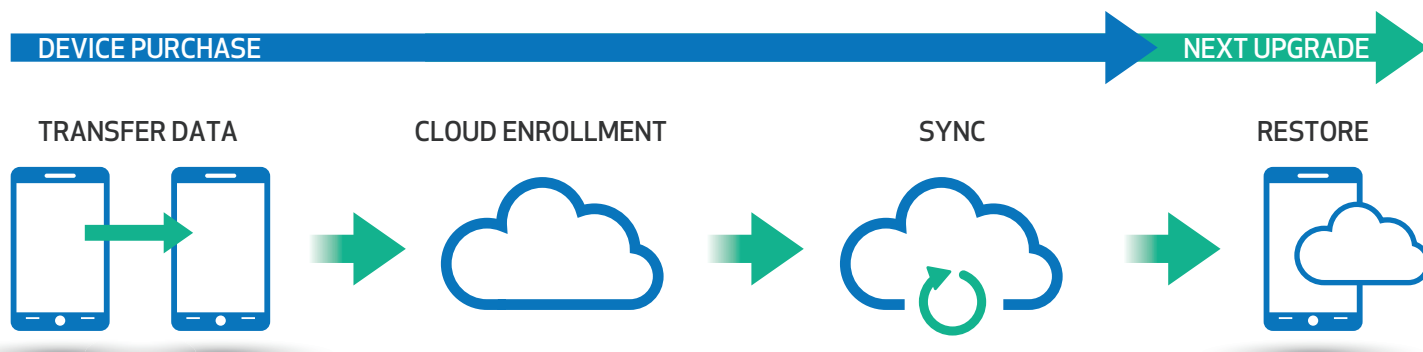
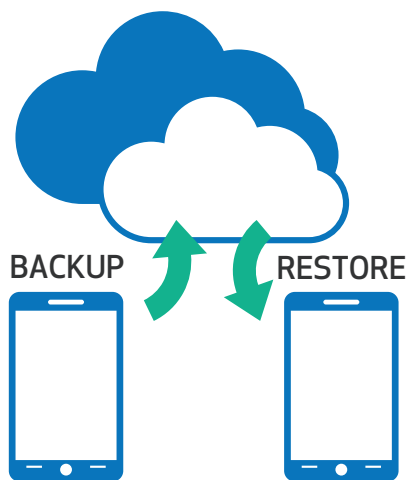
In the end, it is those underlying dynamics that have driven – and continue to drive – the personal mobile content explosion. User demand is high. Technology trends support ever greater levels of content creation and storage. Industry directions signal the need for sticky services – including mobile cloud services – that help prevent churn. Taken together, those personal mobile content realities build a strong case for carriers offering personal cloud storage services.

## THE SOLUTION: SYNCHRONOSS PERSONAL CLOUD™ AND SYNCHRONOSS BACK UP & TRANSFER™

Carriers recognize the importance of white-labelled cloud services that have the flexibility and elasticity to support the evolving needs of mobile users. Synchronoss delivers its Synchronoss Personal Cloud technology to more than 75 of the world's leading mobile carriers. It offers its customer's subscribers a branded solution for protecting all the content on their connected devices. Contacts, photos, videos, music, messages, documents, call logs – subscribers can back-up all of it, simply, securely and automatically. Mobile carriers that have launched personal cloud offerings with Synchronoss have experienced rapid growth in subscriber enrolment and usage.

Synchronoss Backup & Transfer™ is a premium upgrade to the popular Synchronoss Mobile Content Transfer™ product. It is an innovative white label content transfer solution that uses Wi-Fi and cloud capabilities. The solution enables operators to effectively manage the transfer of personal content from their old device to their new device and delivers a variety of other benefits either in-store, online or as part of a broader customer care process.

During the point of device upgrade, Synchronoss Backup & Transfer™ will prompt users to enrol in a cloud backup solution. By keeping the majority of their heavy content payload in the cloud and capitalizing on the speedy transfer of personal content, service providers can greatly reduce future in-store data transfer times.



About Synchronoss: Synchronoss Technologies (NASDAQ: SNCR) is the mobile innovation leader that provides personal cloud solutions and software-based activation for connected devices across the globe. The company's proven and scalable technology solutions allow customers to connect, synchronize and activate connected devices and services that empower enterprises and consumers to live in a connected world.

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