

# SONY®

## White paper

September 2015



Xperia™ C4  
E5303/E5306/E5353

# Purpose of this document

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Sony Mobile Communications product White papers are intended to give an overview of a product and provide details in relevant areas of technology.

**NOTE:** All illustrations, screen images, and elements are for reference only and subject to change at any time without prior notice.

# Document history

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Version		
May 2015	First released version	Version 1
June 2015	Second released version	Version 2
August 2015	Third released version	Version 3
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# Sony Mobile Developer World

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# Product overview

## Master of the selfie

PROselfie Octa-core smartphone with Full HD display

The Xperia™ C4 is a PROselfie Octa-core smartphone with Full HD display and a powerful processor. It's got just what it takes if you're looking for high-quality selfie stills and videos. The 5MP front camera is equipped with the qualities of a main smartphone camera and lets you get great pictures in any situation, indoors or outdoors, with friends, day or night. The experience is further enhanced by an impressive large and crisp display powered by Sony TV technologies. Meanwhile, SteadyShot™ technology in the front camera compensates for shaking and gives all your PROselfies the sharpness they deserve. The front camera also lets you add sound and fun effects such as AR mask to your selfie stills. And if that's not enough to add a unique edge to your selfie, use the Style Portrait feature to add a retro, vampire, mystery blue or other style and share it.

## Only the best

Sony's latest digital imaging technology features in both the front (5MP) and main camera (13MP) to give you extraordinary images. Exmor R™ and HDR are integrated into both cameras, giving you the best pictures in any lighting conditions.

The Xperia™ C4 front camera doesn't just see you. It utilises Superior auto to analyse and adjust settings automatically from among 13 scenes and 4 modes. So you get the best picture possible. No more blurry selfie videos.

## Multimedia enhanced

Watching movies on your smartphone has never been better. The Xperia™ C4 has a 5.5" Full HD display with IPS for a wide view experience. Leveraging on Sony TV technologies, the Xperia™ C4 features both Mobile BRAVIA® Engine 2 and Super vivid-mode, so you can enjoy movies in amazing clarity and colour brightness. The frame around the display is minimal to enhance the viewing experience, and the sound quality is excellent with or without headphones.

## Superior multitasking

Eight active processor cores give you all the performance you need for a busy and fun multitasking lifestyle. To support your entertainment, networking and other demands, the Xperia™ C4 has a large 2600mAh battery. Battery STAMINA mode 5.0 is there to help you take control of how your Xperia™ C4 battery power is used and what it is used for.

## Product specifications

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<b>Operating system</b>	Google™ Android™ 5.0 (Lollipop)
<b>Processor</b>	1.7 GHz Mediatek MT6752 Octa Core
<b>GPU</b>	ARM MaliT760-MP2
<b>Size</b>	150.3 x 77.4 x 7.9 mm
<b>Weight</b>	147 grams
<b>Available colours</b>	Black White Mint
<b>SIM card</b>	Nano SIM
<b>Main screen</b>	
Colours	16,777,216 colour TFT
Resolution	1920x1080 pixels
Size (diagonal)	5.5 inches
Scratch-resistant	Yes – Front with minimum pencil hardness > 9H
<b>Input mechanisms</b>	
Text input	On-screen QWERTY keyboard, 12-key input, Handwriting
Touch screen	Capacitive
Multi-touch capability	Up to 10 fingers supported
<b>Memory</b>	
RAM	2 GB
Flash memory	Up to 16 GB*
Internal Storage	Up to 10 GB*
Expansion slot	microSD™ card, up to 200 GB
Memory card speed class	Class 10**
Memory card UHS speed class	Class 1**
<b>Main Camera</b>	
Camera resolution	13 MP
Exmor	Yes – Exmor RS
Digital zoom	4x
Video recording	Yes – Full HD 1080p
Auto Focus	Yes
Photo Flash	Yes

Front Camera	Yes – HD 720p for video chat and 5 MP for camera capture
<b>2nd Camera</b>	
Camera resolution	5 MP
Exmor	Yes – Exmor R™
Video recording	Yes – Full HD 1080p
Auto Focus	No
Photo Flash	Yes
<b>Sensors</b>	
Accelerometer	Yes
Ambient light sensor	Yes
eCompass	Yes
Hall sensor	Yes
Proximity sensor	Yes
<b>Mobile NFC Payment</b>	
MasterCard PayPass	Yes
American Express Expresspay mobile	Yes
<b>Networks</b>	
E5303	UMTS HSPA+ 900 (Band VIII), 850 (Band V), 1900 (Band II), 2100 (Band I) MHz GSM GPRS/EDGE 850, 900, 1800, 1900 MHz LTE Bands 1, 3, 5, 7, 8, 20
E5353	UMTS HSPA+ 900 (Band VIII), 850 (Band V), 1900 (Band II), 2100 (Band I) MHz GSM GPRS/EDGE 850, 900, 1800, 1900 MHz LTE Bands 1, 3, 7, 8, 28, 40
E5306	UMTS HSPA+ 900 (Band VIII), 850 (Band V), 1700 (Band IV), 1900 (Band II), 2100 (Band I) MHz GSM GPRS/EDGE 850, 900, 1800, 1900 MHz LTE Bands 2, 4, 5, 7, 12, 13, 17
<b>Data transfer speeds</b>	
GPRS (upload and download)	Up to 85.6 kbps (download). Up to 85.6 kbps (upload).
EDGE (upload and download)	Up to 236.8 kbps (download). Up to 236.8 kbps (upload).
HSUPA (upload)	Cat. 6, up to 5.76 Mbps
HSDPA (download)	Cat. 24, up to 42.2 Mbps

LTE (upload and download)	Cat. 4, up to 50 Mbps (upload), up to 150 Mbps (download)
<b>HAC/TTY</b>	
HAC	M3/T3 (E5306 <sup>***</sup> )
TTY	Yes (E5306 <sup>***</sup> )
<b>Talk time (GSM)</b>	Up to 12 hours 47 min. <sup>****</sup>
<b>Standby time (GSM)</b>	Up to <b>634</b> hours <sup>****</sup>
<b>Talk time (UMTS)</b>	Up to 11 hours 26 min. <sup>****</sup>
<b>Standby time (UMTS)</b>	Up to 682 hours <sup>****</sup>
<b>Standby time (LTE)</b>	Up to 646 hours <sup>****</sup>
<b>Music listening time</b>	Up to 53 hours 22 min. <sup>****</sup>
<b>Video playback time</b>	Up to 8 hours 8 min. <sup>****</sup>
<b>Battery (Embedded)</b>	2600 mAh minimum

\* The E5303, E5306 and E5353 have 10 GB of free memory available to the user for downloaded applications and their data, music, pictures and movies while each device has up to 16 GB of flash memory in total. For more details about memory, see “Memory in Android™ devices” on page 17.

\*\* This device meets the minimum hardware requirements to support Class 10 / UHS Speed Class 1 Flash memory. Flash memory performance is dependent on the application and task being performed on the device. If you would like to know about your memory card, refer to the technical specifications that came with the card.







\*\*\* The TTY (Teletypewriter) feature is for deaf or hearing-impaired users. Only the E5306 model supports HAC and TTY.

\*\*\*\* Values are according to GSM Association Battery Life Measurement Technique as performed in controlled laboratory conditions. Actual time may vary.




**NOTE:** Battery performance may vary depending on network conditions and configurations, and device usage.

**NOTE:** All performance metrics are measured under laboratory conditions.

## Categorised feature list

 <p><b>Camera</b>                      Burst mode                      Face detection                      Geotagging                      HDR for Photo                      HDR for Video                      Image stabiliser                      Object tracking                      Creative Effect                      Quick Launch                      Self-timer                      Smile Shutter™                      Superior Auto                      Sweep Panorama                      Touch capture                      Touch focus                      White balance</p>	 <p><b>Music</b>                      Album art                      Bluetooth® stereo (aptX®, A2DP)                      ClearAudio+                      Clear Bass™                      Clear Phase™                      Dynamic normalizer                      TrackID™ music recognition*                      Music application                      What's new*                      xLOUD™ Experience</p>	 <p><b>Internet</b>                      Google Chrome™*                      Google Play™*                      Google™ search*                      Google Voice™ Search*                      Google Maps™ with Street view*                      What's new*                      Xperia™ Lounge</p>
 <p><b>Communication</b>                      Call list                      Facebook™ application*                      Google+*                      Hangouts™*                      Noise suppression                      Twitter™ application*                      Voice enhancement*                      Xperia™ Socialife*</p>	 <p><b>Messaging</b>                      Email                      Gmail™*                      Handwriting recognition                      Predictive text input</p>	 <p><b>Design</b>                      Face Unlock                      Gesture input                      Screenshot capturing                      Screen recording                      Throw                      Mobile BRAVIA® Engine 2                      Voice input                      Wallpaper</p>



 <p><b>Entertainment</b>  Radio (FM radio with RDS*)  Sony Entertainment Network*  YouTube™*</p>	 <p><b>Organiser</b>  Airplane mode  Alarm/Clock/Stopwatch/Timer  Battery STAMINA mode  Calculator  Calendar  Contacts  Setup guide  Sketch</p>	 <p><b>Connectivity</b>  Audio Jack (3.5 mm CTIA)  GPS* (aGPS)  Bluetooth® (BT 4.1 + HS)  DLNA Certified®  GLONASS  HDCP  Media Go™  Media Transfer Protocol support  USB Connector type (microUSB-B)  Microsoft® Exchange  ActiveSync®  Miracast™ Screen Mirroring  NFC  PC Companion  Screen mirroring  Smart Connect  TV SideView  USB charging (1.5A Input)  USB version and speed (2.0 High speed without USB certification)  Wi-Fi® (802.11a/b/g/n)  Wi-Fi® Hotspot functionality</p>
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\* This service is not available in all markets.

# Technologies in detail

The information presented in this section is a general overview of the technology incorporated into the product. However, hardware and software levels of compliance to standards and specifications vary between products and markets. For more information, contact Sony Mobile Developer World or the relevant Sony representative.

## Accessibility and Usability

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<b>Accessibility and Usability</b>	
Talkback*	Yes, default is “off”
Captions*	Yes, default is “off”
Magnifications gestures*	Yes, default is “off”
Large Text*	Yes, default is “Not checked”
High Contrast Text*	Yes, default is “Not checked”
Power button ends call*	Yes, default is “Not checked”
Auto-rotation*	Yes, default is “checked”
Speak Passwords*	Yes, default is “Not checked”
Accessibility Shortcuts*	Yes, default is “off”
Text – to – Speech*	Yes
Touch and hold delay*	Yes, default is “Short”
Color Inversion*	Yes, default is “off”
Color correction*	Yes, default is “off”
Hearing Aid Compatibility (HAC)	Yes
Teletypewriter (TTY)**	Yes (E5306)

\* Android Lollipop feature. Subject to possible change in future releases of Google™ Android™.

\*\* The TTY feature is for deaf or hearing-impaired users. Only the E5306 model supports TTY.

## Device-to-device communications (local)

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### Bluetooth® wireless technology

Bluetooth® profiles supported	<p>Advanced Audio Distribution Profile v1.2          Audio/Video Control Transport Protocol Profiles v1.4          Audio/Visual Distribution Profile v1.3          Audio/Video Remote Control Profile v1.3          Generic Access Profile          General Audio/Video Distribution Profile v1.2          Generic Object Exchange Profile v1.1          Health Device Profile v1.0          Hands-Free Profile v1.6          Human Interface Device Profile v1.0          Headset Profile v1.2          Message Access Profile v1.0          Object Push Profile v1.1          Personal Area Networking Profile v1.0          PhoneBook Access Profile v1.1          SIM Access Profile v1.1          Service Discovery Application Profile v(LocDev)          Serial Port Profile v(DevA DevB)          GATT Client          GATT Server          Find Me Profile v1.0          HID over GATT Profile v1.0          Proximity Profile v1.0          Bluetooth® proprietary audio codec compression algorithms</p>
Core version and supported core features	BT 4.1 + HS
Other supported features	aptX® CD quality audio streaming over Bluetooth® connection
Connectable devices	<p>Products support at least one of the Bluetooth® profiles listed above.          Bluetooth® 4.1 accessories generally require installation of a supporting application.</p>

More information:

[www.sonymobile.com/developer](http://www.sonymobile.com/developer)

[www.bluetooth.com](http://www.bluetooth.com)

**Wi-Fi®**

Supported standards	IEEE 802.11a/b/g/n and Wi-Fi® Wi-Fi Direct®, Wi-Fi Protected Setup, Wi-Fi CERTIFIED Miracast™
Connectable devices	Wi-Fi® access points Wi-Fi Direct compatible devices
Frequency band	2.4 GHz / 5 GHz
Data transfer rate	Up to 150 Mbit/s
Security	Open Authentication Shared Authentication EAP-SIM EAP-AKA EAP-TLS EAP-TTLS/MSCHAPv2 PEAPv0/EAP-MSCHAPv2 PEAPv1/EAP-GTC WPA Personal and WPA2 Personal WPA Enterprise and WPA2 Enterprise
Encryption	WEP 64 bit, WEP 128 bit, TKIP and CCMP (AES)
Power save	WMM-UAPSD
QoS	WMM

## DLNA Certified® (Digital Living Network Alliance)

Supported Device Classes	<p><b>M-DMS – Mobile Digital Media Server</b> Media Types: images, music and video Summary: The digital media server exposes the media files in your device to a Wi-Fi® network. The files can then be accessed from other DLNA CERTIFIED® clients.</p> <p><b>M-DMP – Mobile Digital Media Player</b> Media Types: image, music and video Summary: You can play content stored on another device, for example, a server or a PC, directly on your device.</p> <p><b>M-DMC – Mobile Digital Media Controller</b> Media Types: image, music and video Summary: Digital Media Controllers find content offered by a DMS or M-DMS and match it to the rendering capabilities of a DMR — setting up the connections between the DMS and DMR.</p> <p><b>+PU+</b> Media Types: image, music and video Summary: You can play media in your device on another device, such as a TV or a PC using 2 box push technology. +PU+ is integrated in the Album, Movies and Music applications.</p> <p><b>+DN+</b> Media Types: image, music and video Summary: You can download content stored on another device, for example, a server or a PC, and play the downloaded content directly on your device.</p> <p><b>+UDO+</b> Media Types: image, music and video Summary: A media server uploading function that allows media files to be uploaded to Xperia devices from other DLNA certified clients.</p>
Supported Bearers	Wi-Fi® Wi-Fi Direct®
DRM Support	The DLNA Certified® implementation does not support DRM-protected content.

## Messaging

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### MMS (Multimedia Messaging Service)

According to OMA Multimedia Messaging Service v1.0 + SMIL

### Email

Bearer type (IP)	GPRS, EGPRS, UMTS, LTE, Wi-Fi®
Character sets	BIG5 Traditional Chinese GB2312 Simplified Chinese GB18030 ISO-2022-JP Japanese ISO-8859-1 ISO-8859-2 Eastern Europe ISO-8859-5 Cyrillic ISO-8859-7 Greek ISO-8859-9 Turkish ISO 8859-11 KOI8-R Cyrillic Shift_JIS Japanese USASCII UTF-16 UTF-8 Windows® 874 Windows® 1251 Cyrillic Windows® 1252 Windows® 1254 Turkish Windows® 1258 Vietnamese
Protocols	POP3 and IMAP4
Push email	Microsoft® Exchange ActiveSync® (EAS)
Secure email	SSL/TLS, both port methods (POPS/IMAPS) and START-TLS
HTML mail	Yes (read only)

#### More information:

[www.sonymobile.com/developer](http://www.sonymobile.com/developer)

[www.openmobilealliance.org](http://www.openmobilealliance.org)

## Positioning – location based services

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Supported standards:

- OMA Secure User Plane Location (SUPL) v1.0
- 3GPP™ Control Plane location (incl. Emergency location)

Supported satellite systems:

- GPS
- GLONASS

**NOTE:** When needed, a combination of all the available satellite systems are automatically used to achieve a robust and accurate fix.

## Provisioning (OMA CP)

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OMA CP version 1.1

## Multimedia (audio, image and video)

<b>Audio Playback</b>	<b>Decoder format</b>	<b>Supported in file format</b>
	Audio decoding MPEG-1/2/2.5, audio layer 3	MP3 (.mp3)
	AAC, AAC+, eAAC+	3GPP (.3gp), MP4 (.mp4)
	AMR-NB, AMR-WB	3GPP (.3gp), MP4 (.mp4)
	General MIDI (GM)	SMF (.mid)
	Linear PCM 16 bit	WAV (.wav)
	OTA	OTA (.ota)
	Ogg Vorbis	OGG (.ogg)
	FLAC	FLAC (.flac)
	WMA	ASF (.wma)
<b>Audio Recording</b>	<b>Encoder format</b>	<b>Supported in file format</b>
	AMR-NB, AMR-WB	3GPP (.3gp), MP4 (.mp4), AMR (.amr)
	AAC-LC Channels: Mono/Stereo/5.0/5.1 Sampling rate: 8kHz - 48kHz Bit rate: 8kbps - 160kbps  AMR-NB Channels: Mono Sampling rate: 8kHz Bit rate: All rates (4.75kbps - 12.2kbps)  AMR-WB Channels: Mono/Stereo Sampling rate: 16kHz Bit rate: All rates (6.6kbps - 23.85kbps)	3GPP (.3gp), MP4 (.mp4)
	Ogg Vorbis	Ogg Vorbis (.ogg)
	Linear PCM 16 bit	WAV (.wav)



<b>Image Playback</b>	<b>Decoder format</b>	<b>Supported in file format</b>
	1, 4, 8, 16, 24 and 32 bpp and RLE encoded formats	BMP (.bmp)
	Single and multi-frame, bitmap mask support (GIF87a format and GIF89a format)	GIF (.gif)
	Joint Photographic Experts Group	JPEG (.jpg, .jpeg)
	Portable Network Graphics Bitmap mask support	PNG (.png)
	WebP	WebP (.webp)
<b>Image Capture</b>	<b>Encoder format</b>	<b>Supported in file format</b>
	Joint Photographic Experts Group	JPEG (.jpg)
	Portable Network Graphics Bitmap mask support	PNG (.png)
	WebP	WebP (.webp)
<b>Video Playback</b>	<b>Decoder format</b>	<b>Supported in file format</b>
	MPEG-4 Visual Simple Profile	3GPP (.3gp), MP4 (.mp4)
	H.263 Profile 0	3GPP (.3gp), MP4 (.mp4)
	H.264 High Profile	3GPP (.3gp), MP4 (.mp4)
	H.265 Main Profile	3GPP (.3gp), MP4 (.mp4)
	VP8	VP8 (.webm)
	VP9	VP9 (.webm)
	WMV/VC-1	ASF (.wmv)
	DivX	AVI (.divx)
	Sorenson Spark	FLV (.flv)
<b>Video Recording</b>	<b>Encoder format</b>	<b>Supported in file format</b>
	MPEG-4 Main Profile	3GPP (.3gp), MP4 (.mp4)
	H.263 Profile 0	3GPP (.3gp), MP4 (.mp4)
	H.264 High Profile	3GPP (.3gp), MP4 (.mp4)
	H.265 Main Profile	3GPP (.3gp), MP4 (.mp4)
<b>Audio/Video Streaming</b>	Streaming transport	RTSP according to 3GPPTM HTTP streaming

## **Synchronisation (OMA DS, EAS, Google Sync™)**

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OMA Data Synchronisation protocol versions 1.1.2 and 1.2

OMA Data Formats: vCard 2.1, vCalendar 1.0

Microsoft® Exchange ActiveSync® protocol version 2.5

Microsoft® Exchange ActiveSync® protocol version 12

Microsoft® Exchange ActiveSync® protocol version 12.1

Microsoft® Exchange ActiveSync® protocol version 14

Microsoft® Exchange ActiveSync® protocol version 14.1

Google Sync™

Related information:

*[www.sonymobile.com/developer](http://www.sonymobile.com/developer)*

## **Web browser**

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Google Chrome™ for Android™ is pre-installed in markets/regions where no restrictions apply.

Related information:

*<https://play.google.com/store/apps/details?id=com.android.chrome>*

# Memory in Android™ devices

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To use Android devices efficiently, users should be aware of the different types of device memory. This knowledge is important in order to understand, for example, where data such as music, photos and videos is saved; how many apps can be downloaded from Google Play™; and how photos can be copied to a PC.

Information regarding memory presented in this section may be useful to developers when optimising applications for mobile devices.

Generally, all Android devices share the same basic memory setup. What differs is how much memory is available to you via the different types of memory, and whether your device uses an external SD card or an internal memory chip. Any information specific to the particular device model described in this White Paper is noted as such.

## Types of memory

The types of memory described and numbered below are consistent with the terminology used in Sony mobile device menus and in other content relating to 2015 Xperia™ devices:

1. **Dynamic Memory** (also known as RAM) is used by applications that run when the device is turned on. The amount of Dynamic Memory influences how many applications and operating system services can run at the same time. The Android operating system automatically closes applications and services that are not being used.

However, such automatic functionality has limits. For example, if a lower amount of free RAM is available to applications after a new release of the operating system (due to increased capabilities in the system), device speed will eventually be impacted. This is the main reason that a device cannot be indefinitely upgraded to newer releases of Android™.

If you experience problems with RAM, for example, if the device runs slower than usual or if the Home application restarts frequently when you leave an application, you should minimise the use of apps that run all the time. Social networking apps that connect and update their data online and animated backgrounds are examples of apps that are always running and affect RAM performance. To minimise RAM issues, you could also consider using a static wallpaper instead of a live wallpaper.

To see which apps and services are currently active, go to **Settings > Apps > Running**. You should have at least 50 MB, and ideally 100 MB or more, of free RAM to avoid slowdowns and application restarts.

You should also be aware that if you update the device to a later Android release, the load on the built-in Dynamic Memory will increase due to the addition of more features. As a result, the device may run slower after an update.

The Xperia™ C4 has 2 GB of RAM available to the Android OS and any installed applications. 1.4 GB of the total RAM is in use during normal operation when the user starts using the device out of the box.

2. **System Memory** (also known as “System partition” or “/system”) is used for the Android OS and for most applications that are pre-loaded from the factory. This type of memory is normally locked, and can only be changed through a firmware upgrade. There is usually some free space available in this section of memory. However, since it is locked, you cannot save apps, photos or any other content to this memory. System Memory is reserved for future firmware upgrades, which almost always need more memory than the original firmware. You cannot see or influence the use of this memory.

**3. Internal Storage is referred to as "working" memory.** It can be compared to the C: drive on a PC or to the startup disk on a Mac.

This type of memory is used to store all application downloaded from the Google Play™ Store (and other sources) as well as their settings and data (such as emails, messages and calendar events, for example). All applications have an allocated area for application data. Memory dedicated to an application is inaccessible to other applications.

Some game applications also store content such as game music and game level information outside their own designated area. In most cases, an application can choose to save its data in a location of its own choosing (outside the protected application settings area). Generally, such content is not deleted when an application is uninstalled; it must be removed manually by connecting the device to a computer with a USB cable, or by using a file manager application.

Internal storage is also used for all added user content. For example, photos taken using the device's camera, media files downloaded from the Internet and file transfers are stored in this area. Typical user content includes:

- photos
- movies
- music
- Email attachments

Internal Storage will tend to fill up as a result of normal usage. Devices with a large initial Internal Storage can handle more applications and store more user content.

If the Internal Storage starts to get full, the device slows down, and in some cases it might no longer be possible to install more apps. You should always ensure that you have at least 100 MB of free Internal Storage. If not, you should consider removing some apps that you seldom use, or move content that you do not frequently access to external storage.

You can see approximately how much Internal Storage is free in **Settings > Storage > DEVICE MEMORY**. You can also view more details about how much memory is used by applications under **Settings > Apps**. Depending on the particular variant of the device, the Xperia™ C4 has 10 GB of Internal Storage available out of the box.

Please note that in Sony Mobile 2015 products, "Internal Storage" is now the combination of what was previously known as "Device Memory" or "Phone Memory" (for applications and their data – also previously known as "/data") and "Internal Storage" (for user's content – also previously known as "/sdcard"). The changes in Internal Storage were made so that memory usage could be more flexible and to allow encryption of user content.

### **Memory card slot**

Some products include both a large internal memory and a built-in memory card reader. Android manages devices with a built-in memory card reader and internal memory differently from a device that includes only a built-in memory card reader.

Since most applications expect only a single location for storage, such applications will not generally allow you to SAVE anything to the memory card (i.e., they do not offer the option to choose a storage location). However, some applications (for instance, the Sony Mobile "Camera" application) may actually allow you to do so. Other applications, for example, backup applications such as the Sony Mobile "Memory" application, will by definition be configured to copy content from the Internal Storage to the external SD card.

On the other hand, when it comes to reading from an external SD Card, you will be able to access content (for example, videos, photos and music) on a memory card inserted in this slot without any special consideration since the Android system searches all available memory for content. Therefore, such products may be regarded as supporting a fourth type of memory, called “External Card” or “SD Card”.

4. **SD Card** (known as “/ext\_card” from a programmer’s point of view, or by other names in other Android products) is the name for the removable SD memory card in all 2015 Sony Mobile products. As described in the previous section, this External Card memory is generally more limited in that any application can read from it, but many applications cannot save to this card. Only a few applications, including backup applications and file manger applications, have the capability to save to this card.

### **Backing up data to different memory types**

Generally, you should not save photos, videos and other personal content solely on the internal memory of a device. If something should happen with the hardware, or if the device is lost or stolen, the data stored on the device’s internal memory is gone forever.

In a device where an SD card reader is the main memory, it is relatively easy to take the card out and copy all content to a PC or Mac, or to an entertainment device with a memory card slot. In a product featuring Internal Storage as the main memory, it is not possible to physically remove the memory. Instead, any critical or high-value content must either be copied to an external SD card by a special backup application, transferred to remote storage over a network (mobile or Wi-Fi), or to a computer via a USB cable.

To facilitate the transfer of data via a cable, the Xperia™ C4 supports Media Transfer Protocol (MTP), which makes it possible to easily transfer content back and forth between your device and a Windows® PC. For Apple™ Mac® computers, a special application called Sony™ Bridge for Mac is available with built-in support for MTP. This application can be downloaded from the Xperia™ C4 support page.

Note that you do not need to back up or make a copy of applications that you have downloaded from the Google Play™ Store. They can normally be downloaded again after you have set up your Google account to work in a new device (or in a device where the memory has been completely erased).

#### **Note 1:**

Some Android devices, including Sony Mobile devices from 2012 and Sony Ericsson devices from 2011 and earlier, do not use a single “Internal Storage” for both applications (and their data) and user content. Instead, these devices use either an external SD card for user content, or a corresponding area of internal memory to reproduce the functionality of an SD card. In such devices, there is a fixed limit between the application area (“/data”) and the user content area (“/sdcard”), with the result that user content can build up and reach this limit. When the user content reaches this limit, no additional data can be added using any application. For example, the camera application would no longer be able to capture additional photos even if a considerable amount of free space was available in the application area. This limit also applies to the application area. Downloading and installing new applications would not be possible even if there was enough free memory in the user content area.

#### **Note 2:**

Some devices with integrated storage have abandoned the distinction between the application area and the content area when it comes to a Factory Data Reset. As a result, there is no option in such devices to perform a Factory Data Reset and preserve content. In such devices, all content is completely deleted from the device when a reset is performed.

In contrast, Sony Mobile’s memory integration solution makes it possible to preserve user content in this situation. Therefore, when performing a Factory Data Reset, the default action will still be to only remove applications and their data, and an option box must be checked if all content is to be removed as well (as might be desirable when selling the device second-hand).

**Note 3:**

For a developer, it is important to note that from a programming point of view the location names used to refer to the different memory areas described in Note 1 are still valid, i.e., the area used for applications (“/data”) is still present, as is the area used for content (“/sdcard”).

In reality, “sdcard” is a “symbolic link” to “/data/media”. However, from inside an Android application, “/sdcard” can still be used. For example, you can use “sdcard/DCIM/100Android” to find all camera images. The continued use of “/sdcard” to access the content area ensures compatibility across different products and Android releases in this regard.

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