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Connectivity

White paper
April 2011

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This document

This Sony Ericsson White paper is intended to give enterprise users an overview of specific smartphone features and provide details in relevant areas of technology.

This document contains specifications for Sony Ericsson smartphones launched on Android™ 2.3 or later.

Document history

Version

April 2011	First released version	Version 1
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Sony Ericsson website

For more information about Sony Ericsson business propositions, go to www.sonyericsson.com

This White paper is published by:

Sony Ericsson Mobile Communications AB,
SE-221 88 Lund, Sweden

www.sonyericsson.com

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First released version (April 2011)
Publication number: 1252-4075

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Introduction

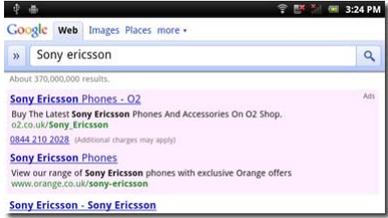
The connectivity options in the Sony Ericsson Android™ smartphones empower mobile workers to be part of the integrated work force by eliminating downtime and increasing productivity. This document shows what features are available in the smartphones for connecting to services, networks, other devices and interfaces.

Use your smartphone to connect to the Internet and your corporate network at any time via **Wi-Fi®** or **tethering** (turning your smartphone into a wireless hotspot). Industry-standard **VPN** protocols ensure a secure connection. With tethering you can also share your Internet connection with your colleagues.

Being connected to Internet all the time, means you can just tap the Android™ **web browser** to quickly check up on things, like time schedules, news or your intranet.

You can also connect your smartphone to useful applications and services outside of your corporate network. For example, you can find your way to a meeting using the built-in GPS receiver and **Google Maps™**. Once you've arrived, you can connect your smartphone to a TV using an **HDMI** cable and show your office documents on a large screen. When you're back in the office again, you can use **Device Stage™** to maintain, update and synchronise the smartphone with your corporate server.

Feature overview

 <p>Network access bearers</p> <ul style="list-style-type: none"> - VPN - Wi-Fi® - Tethering - Bluetooth™ 	 <p>Browsing</p> <ul style="list-style-type: none"> - Web browser 	 <p>Connectivity services</p> <ul style="list-style-type: none"> - Google Maps™ - HDMI - DLNA™ - Device Stage™
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Network access

You can access the Internet and your corporate network in several ways using your Sony Ericsson Android™ smartphone. The method you choose is dependent on the environment you are currently in, what work tools you have, and your corporate IT policies.

Once you've established a secure connection, it's easy to reach your corporate resources from your smartphone. You can then access services such as your corporate intranet, time reporting tools, sales support systems and internal databases, depending on which services your company has set up for external access.

With Android™ multitasking, you can maintain an Internet connection while you use other services or features in your smartphone. For example, you can participate in a conference call and watch a shared presentation at the same time.



VPN

Your smartphone contains a VPN (Virtual Private Network) client that provides a secure remote connection to your corporate servers using industry-standard protocols and user authentication. This connection is Internet based.

Specification

VPN	PPTP (Point-to-Point Tunneling Protocol) L2TP (Layer 2 Tunneling Protocol) L2TP/IPSec PSK (Pre-shared key based L2TP/IPSec) L2TP/IPSec CRT (Certificate based L2TP/IPSec)
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Setup

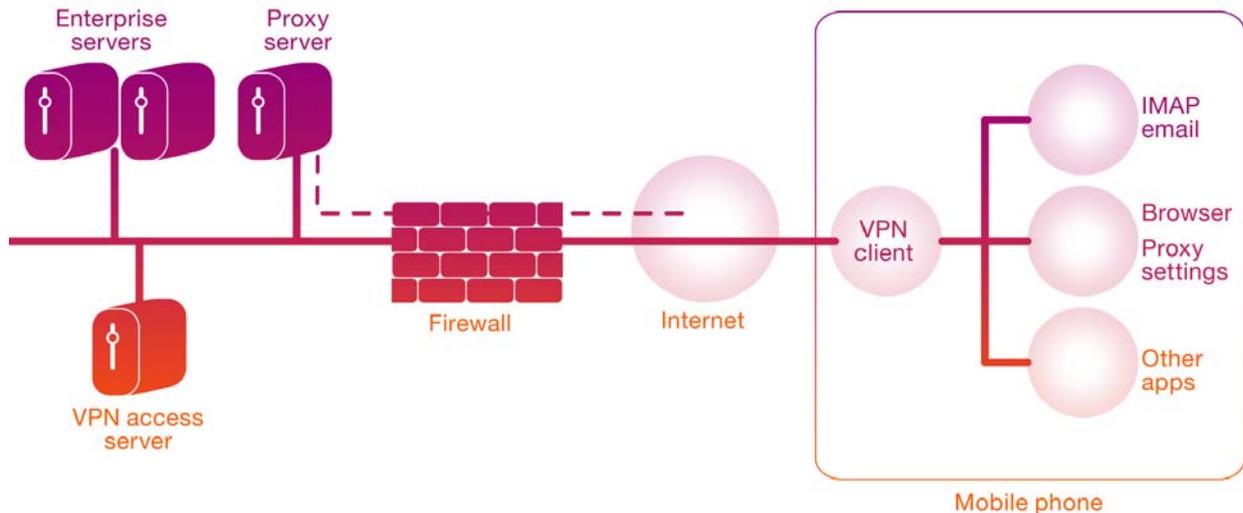
Your smartphone supports several standard VPN technologies. If your company supports at least one of them, the VPN setup requires no additional network configuration. But you still need to make sure your smartphone supports your specific corporate VPN protocols and authentication methods.

Some corporate VPN networks require users to authenticate themselves with certificates before allowing access. Push the user certificates from the corporate server to the individual smartphones. The user receives and installs it on the smartphone.

Certificates can also be downloaded to smartphones, for example, from your corporate website or from prepared memory cards.

Having set this up on the server side, you then need to enter your corporate VPN settings via the general settings in your smartphone.

Schematic overview of how a basic VPN connection works.



Wi-Fi®

You can easily connect your smartphone to an available wireless network or high-speed Internet hotspot via Wi-Fi®. Connect to such Wi-Fi® hotspots within range at the office, at home or in public places. Some networks are open and some are secured. For secured networks, for example, at your office, you need to enter a password.

Use Wi-Fi® to wirelessly connect to your corporate VPN network and safely access internal services such as an intranet. You can also share information in your smartphone with other devices that are connected to the same network, for example, a computer, a TV or a camera.

Wi-Fi® profiles are automatically stored in your smartphone. This means that when you want to connect to a network that you have previously used, you do not have to enter your user credentials again.

Specifications

Supported standards	IEEE 802.11b/g/n and Wi-Fi®
Connectable devices	Wi-Fi® access points
Frequency band	2.4 GHz
Data transfer rate	Up to 72 Mbit/s
802.1X authentication methods	EAP-TLS EAP-TTLS EAP-FAST EAP-SIM PEAPv0 (EAP-MS-CHAP v2) PEAPv1 (EAP-GTC) LEAP
Hotspot security	WEP 64 bit and 128 bit TKIP CCMP (AES) Open Authentication Shared Authentication EAP-TLS EAP-TTLS/MSCHAPv2 PEAPv0/EAP-MSCHAPv2 PEAPv1/EAP-GTC WPA Personal and WPA2 Personal WPA Enterprise and WPA2 Enterprise
Encryption	WEP, TKIP and AES

Setup

You need to enable Wi-Fi® in your smartphone's settings. The smartphone then scans for available networks and displays them. You can also manually add a Wi-Fi® network that you want to connect to. The closer the smartphone is to a Wi-Fi® hotspot, the stronger is of course the signal.

Tethering – turning your smartphone into a wireless hotspot

Tethering lets you share your smartphone's Internet connection with other computers and devices. In practice, this means that just one Sony Ericsson Android™ smartphone can provide several of your colleagues with Internet access and corporate network access, for example, while you are waiting at an airport.

Tethering is very useful since you do not need to search for available Wi-Fi® hotspots, instead you turn your smartphone into a Wi-Fi® hotspot and other devices can connect to it.

This method of connecting to Internet is more secure than using other available Wi-Fi® hotspots, since the connection runs inside your own operator's mobile network.

Specifications

USB tethering	Supported by Windows® 7, Vista and Linux. Windows® XP requires installations of configuration files first.
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Setup

Once your smartphone has an Internet connection, you can share it in several ways:

- Use a USB cable to share with only one other device
- Turn your smartphone into a portable Wi-Fi® hotspot and share with up to five devices

You need to set up tethering via the smartphone's settings. You must also set a password for the connection, which has to be entered in the connecting devices in order for them to access the connection.

Schematic overview of how tethering works.



Bluetooth™

Use the Bluetooth™ function to wirelessly send files to other Bluetooth™ devices such as computers and smartphones. Or connect to handsfree accessories such as a headset or a car kit. Once you have paired your smartphone with a Bluetooth™ device, your smartphone will remember this pairing, so you only have to do this once.

The Bluetooth™ functionality is built into a large number of devices that you can use with your smartphone. The benefits of this wireless transfer method are that it's easy, secure and mobile. Bluetooth™ transfers work best within a 10-meter (33 foot) range.

Specifications

Bluetooth™ profiles supported	Advanced Audio Distribution Profile v1.2 Audio/Video Remote Control Profile v.1.0 Handsfree Profile v1.5 Headset Profile v1.1 Object Push Profile v1.1 Phonebook Access Profile v1.0
Core version and supported core features	2.1+EDR, Advanced Audio
Connectable devices	Products supporting at least one of the profiles above.
Range	10 meters (33 feet) with no solid object in between

Setup

Turn on the Bluetooth™ function in your smartphone and set your smartphone to “discoverable”, if you want other Bluetooth™ devices to detect it. In some cases you have to manually pair your smartphone with other Bluetooth™ devices.

Browsing

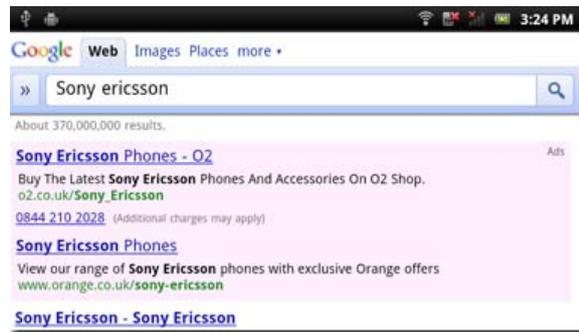
The Android™ browser in the Sony Ericsson Android™ smartphone quickly connects to mobile broadband Internet via 3G or Wi-Fi®. Secure websites such as your intranet can be accessed using SSL/TLS protocols.

Web browser

Advanced rendering techniques help bring a desktop like browsing experience onto a smaller screen. The browser also supports Adobe™ Flash™, which enhances the browsing experience.

You can also switch between multiple windows and zoom in or out with the multi touch display.

Beyond the native Android™ browser, you can download other browser applications from Android Market™ that suit your browsing preferences.



Specifications

Browser version	Android™ 2.3 browser (based on WebKit)
Connections	UMTS HSPA GPRS
Navigation/rendering	Pan & zoom Landscape/portrait rendering Full page PC rendering Adobe™ Flash™ 10.1
Browser compliancy	HTML version 4.0 and 5.0 XHTML Basic version 1.0 XHTML 1.1 CSS 2.0, 2.1 and 3.0 JavaScript 1.7/ECMA-script 262 3rd edition DOM 2.0 and 3.0
Supported device API	Geo-location API
Protocol compliancy	HTTP/1.1 TLS 1.0 and SSL 3.0 Gzip

Connectivity services

Your Sony Ericsson Android™ smartphone comes with a range of connectivity services that help make your work life easier and more organised. For example, you can find your way to a meeting using the interactive map, or get directions as you drive. Once you get to your meeting, you can connect your smartphone to a TV screen and show your presentations.

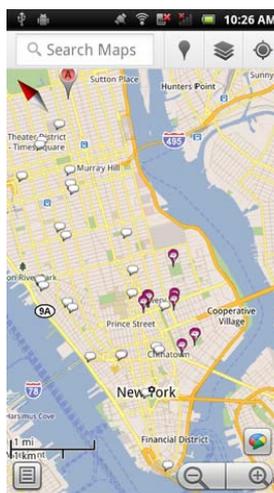
You can also connect your smartphone locally to a computer and synchronise your smartphone information with that on your computer.

Google Maps™

With Google Maps™ you can track your current location, view real-time traffic situations and receive detailed directions to your destination. Your smartphone has a GPS receiver that uses satellite signals to calculate your location. When you view a map in Google Maps™ you make an Internet connection and data is transferred to your smartphone.

Example of features

- My location
- Business listings (addresses, phone numbers)
- Latitude (locate other people)
- Directions
- Satellite layer
- Voice search
- My Maps



HDMI

Connect your Sony Ericsson Android™ smartphone to an HDMI equipped device, such as an HD TV, with an HDMI (High Definition Multimedia Interface) cable and show your smartphone content on the screen.

With this feature you no longer need a computer to show other people office documents, presentations, photos or videos. Use your smartphone to access files from a network or from the memory card.



Specifications

Connector	HDMI type D (micro connector)
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Setup

Connect your smartphone to an HDMI equipped device using an HDMI cable. An HDMI equipped device can for example be an HD TV set, a monitor or a projector. The device turns on and switches to the HDMI channel automatically if it supports CEC* (Customer Electronic Control), and has Once touch play** activated.

If the device doesn't support CEC, follow the instructions shown on your smartphone to turn on the device and switch to the HDMI channel manually. You can navigate using your smartphone's touch screen or by using the device's remote controller.

* CEC performs remote control functions.

** Enables the HDMI device to turn on automatically from standby mode.

DLNA™

The Sony Ericsson Android™ smartphones are DLNA™ (Digital Living Network Alliance) certified. This means your smartphone can share media files with other DLNA™ devices through a Wi-Fi® network.

DLNA™ certified products are built to work together, even if they come from different companies. You can choose the devices that are right for your company, regardless of the manufacturer.

When your smartphone is connected to your office network through Wi-Fi® and has the **Media Server** application, other DLNA™ devices connected to the same network can access, view and play images and music saved in your smartphone. Other devices can be, for example, a computer with client software, a camera or a TV.

Specifications

Supported device classes	M-DMS – Mobile Digital Media Server Media Types: Images Summary: The digital media server exposes the media files in your smartphone to a Wi-Fi® network. The media can then be accessed from other DLNA™ clients.
Supported bearers	Wi-Fi®
DRM support	The Sony Ericsson DLNA™ implementation does not support DRM protected content.

Setup

For DLNA™ to work, you need to set your smartphone as a DLNA™ server in your network.

To set up your smartphone with other DLNA™ devices

1. Connect your smartphone to the Wi-Fi® network you want to use.
2. Start the Media Server application and activate Media Server.
3. Connect the other DLNA™ device to the same network as your smartphone, and select your smartphone as the server.
4. Transfer and show your smartphone content on the other device.

Smartphone maintenance using Device Stage

Sony Ericsson Android™ smartphones support **Device Stage**. This is a feature that comes with Windows® 7. It gathers everything you can do with a connected device into one view. Connect your smartphone to a computer using a USB cable and then synchronise your contacts and calendars, update your smartphone software, organise your smartphone content, transfer files, and get an overview of your smartphone status.

Setup

When you connect your smartphone to a computer running on Windows® 7 for the first time, Windows® 7 configures Device Stage according to specifications defined by Sony Ericsson and by Windows®. Device Stage automatically opens and displays a customised view depending on your smartphone's contents and your previous actions using the smartphone.

No additional software is needed for this to work – it's all already included in your smartphone.

Specifications

Operating system	Microsoft® Windows® 7
Protocol	MTP 1.0 (Media Transfer Protocol)
Connection	USB cable
Features	<ul style="list-style-type: none"> Synchronise calendar, contacts, notes, tasks New software notifications/Update software Backup option Battery status Storage capacity/free space Missed calls New pictures/videos that can be imported Set ringtones Automatic notification of new Device Stage version Special offers

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