Android Tech on control and test

2012年10月24日 星期三

Dumpsys Information - Android Open Source

Preface

Dumpsys is a tool to gather various information from Android device and tell you its system status. All you have to do is to execute a command - "adb shell dumpsys" on your computer with J2SDK and Android SDK. Let's take a look on it.

Description

After executing the command of "adb shell dumpsys", there're various service messages are outputted as follows. (In this case, I used an Android device to depict how to get the information and what they stand for.)

Currently running services:
accessibility
account
activity
alarm
apn_settings_policy
application_policy
appwidget
audio
backup
battery
batteryinfo
bluetooth
bluetooth_a2dp
bluetooth_avrcp
bluetooth_policy
browser_policy
clipboard
clipboardEx
connectivity
content
country_detector
cpuinfo
CustomFrequencyManagerService
date_time_policy
device_info
device_policy
devicestoragemonitor
DirEncryptService
diskstats
drm.drmManager
dropbox
eas_account_policy
email_account_policy
enterprise_policy
enterprise_vpn_policy
entropy
firewall_policy
FMPlayer
gfxinfo
hardware
input_method
iphonesubinfo
isms
location
location_policy
mdm.remotedesktop
media.audio_flinger
media.audio_policy
media.camera
media.player
media.yamahaplayer
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misc_policy
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notification
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uimode
usagestats
usb
vibrator
voip
vpn_policy
wallpaper
wifi
wifi_policy
wifip2p
window

In above list, we see that there're various functional services are running on Android device. When debug engineering is necessary, we could get a lot of useful information from dumpsys for debugging purpose.

We've discussed the MonkeyRunner Control with Jython script in separate article. We can check the testing result by comparing image. However, we always hope to acquire more clues to point out the root cause of problem.

Typically, I illustrate two situations. First one is when the problem is caused by up layer (Framework layer or UI representation), but it's work normally at lower layer (E.g. driver). For instance, when trying to switch Bluetooth On, you may observe the icon on UI which remains Off state. But the driver of Bluetooth has been powered on. In another situation we can think about is oppositive to last case

Now we have another choice to make result more accurately. Fortunately, we can monitor both system status by using parameter inspection from outputted information of dumpsys on Android device and UI comparison by using MonkeyRunner manner as the necessary testing criteria.

Usage
dumpsys [running_service_name]

In case nothing is followed by dumpsys, the dumpsys will output all the information of running services.

What information can be found in Dumpsys ?

Dumpsys outputs various message to depict system status of an Android device. Let's talk about some frequent used messages.

When you need power relative information, you can get them by following information.

Battery Information from Dumpsys

Execute the command of "adb shell dumpsys battery", you may see the following information.

Current Battery Service state:
AC powered: false
USB powered: true
status: 2
health: 2
present: true
level: 100
scale: 100
voltage:4191
temperature: 350
technology: Li-ion

From above information, you can get the information, including type of power source, battery capacity, measured battery voltage, measured temperature and so on.

The definitions of each parameter from battery information are as follows,

AC powered:false (Power source)
USB powered:true (Power source)
status:5 (see next section)
health:2 (see next section)
present:true (indicating whether a battery is present.)
level:100 (returns battery level as a percentage)
scale:100 (maximum battery level)
voltage: 4195 (an integer containing the current battery voltage level)
temperature: 380 (an integer containing the current battery temperature)
technology: Li-ion (technology of the current battery)

With respect to status in battery information, the definition of value is as follows,
Defined in android.os.BatteryManager
BATTERY_STATUS_UNKNOWN (0x00000001)
BATTERY_STATUS_CHARGING (0x00000002)
BATTERY_STATUS_DISCHARGING (0x00000003)
BATTERY_STATUS_NOT_CHARGING (0x00000004)
BATTERY_STATUS_FULL (0x00000005)

With respect to health in battery information, the definition of value is as follows,

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關於我自己

Carl Chen at New Taipei City

Smart Embedded/Mobile Device Verification Design for over 10 years. Web/Database System Integrated design for over 2 years. Master degree in computer science, AS degree in Electronic Engineering, PMP certified.

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Defined in android.os.BatteryManager
BATTERY_HEALTH_UNKNOWN (0x00000001)
BATTERY_HEALTH_GOOD (0x00000002)
BATTERY_HEALTH_OVERHEAT (0x00000003)
BATTERY_HEALTH_DEAD (0x00000004)
BATTERY_HEALTH_OVER_VOLTAGE (0x00000005)
BATTERY_HEALTH_UNSPECIFIED_FAILURE(0x00000006)
BATTERY_HEALTH_COLD (0x00000007)

When you need to get the information from Bluetooth you can use following information.

Bluetooth Information from Dumpsys

Execute the command of "adb shell dumpsys bluetooth", you may see the following information.

```
DUMP OF SERVICE bluetooth:
 mIsAirplaneSensitive = true
 mIsAirplaneToggleable = true
 Local address = 00:07:0B:16:23:AC
 Local name = MyBTPhone
 isDiscovering() = false
```

The definitions of Bluetooth information for each parameter are as follows,

Parameter	Value	Definition
mIsAirplaneSensitive	true | false	Airplane mode can prevent Bluetooth radio from being turned on
mIsAirplaneToggleable	true | false	Airplane mode can prevent Bluetooth radio from being turned on
Local name		Bluetooth device name
Local address		Bluetooth Address
isDiscovering	true|false	Discoverable for Bluetooth

The following information will tell you what the status for telecom is.
telephony.registry Information from Dumpsys

Execute the command of "adb shell dumpsys telephony.registry", you may see the following information.

```
DUMP OF SERVICE telephony.registry:
last known state:
  mCallState=0
  mCallIncomingNumber=
  mServiceState=0 home TTT TTT 46999  HSDPA:9 CSS not supported -1 -1 RoamInd=-1 DefRoamInd=-1 EmergOnly=false
  mSignalStrength=SignalStrength: 19 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 gsm|lte 4
  mMessageWaiting=false
  mCallForwarding=false
  mDataActivity=0
  mDataConnectionState=0
  mDataConnectionPossible=true
  mDataConnectionReason=dataDisabled
  mDataConnectionApn=
  mDataConnectionLinkProperties=null
  mDataConnectionLinkCapabilities=null
  mCellLocation=Bundle[mParcelledData.dataSize=76]
registrations: count=8
```

Note, the information telephony.registry provided is the last know state. It means it may not the state that device is running.

The definitions of telephony.registry information for each parameter are as follows,

Parameter	Definition/Value
mCallState	Call State 0 - CALL_STATE_IDLE(No activity.) 1 - CALL_STATE_RINGING 2 - CALL_STATE_OFFHOOK
mCallIncomingNumber	Last incoming call number
mServiceState	Radio service State 0 - STATE_IN_SERVICE(Normal operation condition, the phone is registered with an operator either in home network or in roaming.) 1 - STATE_OUT_OF_SERVICE (Phone is not registered with any operator, the phone can be currently searching a new operator to register to, or not searching to registration at all, or registration is denied, or radio signal is not available.) 2 - STATE_EMERGENCY_ONLY (The phone is registered and locked. Only emergency numbers are allowed.) 3 - STATE_POWER_OFF(Radio of telephony is explicitly powered off.)
SignalStrength	Radio Signal Strength (RSSI)
mMessageWaiting	Radio Message Waiting true | false
mCallForwarding	Radio Call Forwarding true | false
mDataActivity	0 - Radio Data Call Activity: DATA_ACTIVITY_NONE(No traffic.) 1- DATA_ACTIVITY_IN(Currently receiving IP PPP traffic.) 2 - DATA_ACTIVITY_OUT(Currently sending IP PPP traffic.)

	3 - DATA_ACTIVITY_INOUT(Currently both sending and receiving IP
mDataConnectionState	Radio Data Connection State 0 - DATA_DISCONNECTED (Disconnected. IP traffic not available.) 1- DATA_CONNECTING(Currently setting up a data connection.) 2 - DATA_CONNECTED (Connected. IP traffic should be available.) 3 - DATA_SUSPENDED (Suspended. The connection is up, but IP traffic is temporarily unavailable. For example, in a 2G network, data activity may be suspended when a voice call arrives.)
mActiveDataConnectionState	Radio Data Connection State 0 - DATA_DISCONNECTED (Disconnected. IP traffic not available.) 1- DATA_CONNECTING(Currently setting up a data connection.) 2 - DATA_CONNECTED (Connected. IP traffic should be available.) 3 - DATA_SUSPENDED (Suspended. The connection is up, but IP traffic is temporarily unavailable. For example, in a 2G network, data activity may be suspended when a voice call arrives.)
mDataConnectionPossible	Active Radio Data Connection true | false
mDataConnectionReason	Reason for data Connection
mDataConnectionApn	APN Name
mDataConnectionInterfaceName	Name of data connection interface
mCellLocation	Information of Cell Location
registrations: count	Recording count of registration

When you want to know the status of WiFi, you can refer to following information.

WiFi Information from Dumpsys

Execute the command of "adb shell dumpsys wifi", you may see the following information.

DUMP OF SERVICE wifi:
Wi-Fi is enabled
Stay-awake conditions: 0
Internal state:
current HSM state: ConnectedState
mLinkProperties InterfaceName: wlan0 LinkAddresses: [1.1.2.3/24] Routes: [0.0.0.0/0 -> 1.1.2.6,] DnsAddresses: [1.1.2.1,] HttpProxy: [ProxyProperties.mHost == null]
mWifiInfo SSID: Google, BSSID: 00:08:0a:02:03:08, MAC: 00:00:00:00:00:80, Supplicant state: COMPLETED, RSSI: -63, Link speed: 13, Net ID: 1, Explicit connect: true
mDhcpInfoInternal addr: 1.1.2.3/24 mRoutes: 0.0.0.0/0 -> 1.1.2.6 | dns: 1.1.2.6, dhcpServer: 1.1.2.6 leaseDuration: 7200
mNetworkInfo NetworkInfo: type: WIFI[], state: CONNECTED/CONNECTED, reason:(unspecified), extra: (none), roaming: false, failover: false, isAvailable: true
mLastSignalLevel 3
mLastBssid 00:00:00:00:00:00
mLastNetworkId 1
mReconnectCount 0
mIsScanMode false
Supplicant status
bssid=00:00:00:00:00:00
ssid=Google
id=1
mode=station
pairwise_cipher=CCMP
group_cipher=CCMP
key_mgmt=WPA2-PSK
wpa_state=COMPLETED
ip_address=1.1.2.3
address=00:00:00:00:00:00

The definitions of wifi information for each parameter are as follows,

Parameter	Value	Definition
Wi-Fi is	disabled|connected enabled|disconnected	Wi-Fi Radio State
Stay-awake conditions		Stay-awake conditions value
Internal state		Internal state
interface		Netowrk Interface
runState		Run State
SSID		Wi-Fi AP's SSID
BSSID		BSSID of Wi-Fi AP
MAC		MAC Address for Wi-Fi
Supplicant state		Supplicant state for Wi-Fi
RSSI		RSSI for Wi-Fi
Link speed		Link speed for Wi-Fi

Net ID		Net ID for Wi-Fi
ipaddr		Obtained IP Address for Wi-Fi
gateway		Gateway for Wi-Fi
netmask		Netmask for Wi-Fi
dns1		Primary DNS for WiFi
dns2		Secondary DNS for WiFi
DHCP server		DHCP address for WiFi
scanModeActive	true | false	Scan Mode Active for Wi-Fi
haveIpAddress	true | false	Have IP Address for Wi-Fi
obtainingIpAddress	true | false	Obtaining Ip Address for Wi-Fi
lastSignalLevel		Last Signal Level for Wi-Fi
explicitlyDisabled		Explicitly Disabled for Wi-Fi

There're more information you can get from dumpsys for your purpose. Aforementioned has provided you a good start on how to get them. Now, it's your turn.

When you want to know what network interface you are using, you can look at following information.

Connectivity Information from Dumpsys

Execute the command of "adb shell dumpsys connectivity", you may see the following information.

```
DUMP OF SERVICE connectivity:
NetworkInfo: type: mobile[UMTS], state: DISCONNECTED/DISCONNECTED, reason: dataDisabled, extra: vivi, roaming: false,
failover: false, isAvailable: true
Mobile data state: DISCONNECTED
Data enabled: user=true, policy=true

Active network: WIFI
NetworkInfo: type: WIFI[], state: CONNECTED/CONNECTED, reason: (unspecified), extra: (none), roaming: false, failover: false,
isAvailable: true
android.net.wifi.WifiStateTracker@00000000
...
```

The definitions of connectivity information for each parameter are as follows,

Parameter	Value	Definition
Active network	WiFi | UMTS	Check if Active Network is transmitted by WiFi or UMTS
NetworkInfo: type: mobile		NetworkInfo: type for mobile: HSDPA|UMTS
state	UNKNOW / IDEL	Radio State
	CONNECTED|CONNECTED	
	DISCONNECTED|DISCONNECTED	
Extra		NetworkInfo: Carrier Name
roaming	true | false	Roaming state
failover	true | false	
isAvailable	true | false	Check if Mobile network is available

How Jython and MonkeyRunner use these information to do automated testings ?

Using shell command in MonkeyRunner and executing dumpsys service_name, you can get the particular information from it and parse/filter those information by Jython Script. Hence, you can use these information for your testing or control purpose.

Reference

Dumpsys, http://source.android.com/tech/input/dumpsys.html

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3 則留言:

Pavan Deshpande 2013年7月1日 下午10:39

作者已經移除這則留言。

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Softql 2015年3月19日 上午12:28

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RF Post processing

回覆

Dilip Mall 2015年6月25日 上午4:46

Thanks for sharing information.
recharge plans

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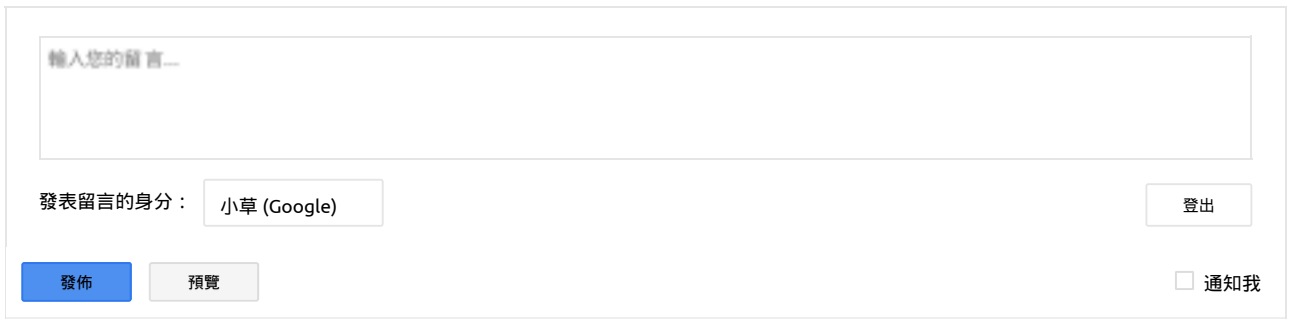
回覆



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十月 (18)