



In c i o n f o S e i n g

Google Clo d IoT f o he All i n n e R

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S e b e i n c i o n f o

G o o g l e C l o u d I o T o n

A l l i n n e R d e e l o e K i

C o n e n

C h a e E e c i e S m m a

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Definitions



PM DK A GPIO DRAM
' ' D
AP B F B P
L L F M

Prerequisites

P
O D L DK D C
O D A F P
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D G C I PC D C I A
G
C G C I C P
D C I A G

Create project	
	wangxiao@allwinertech.com created allwinner-164401 April 12, 2017 at 9:27:52 AM UTC+8
User	wangxiao@allwinertech.com
Resource name	projects/allwinner-164401
Request	
Project	
Create time	2017-04-12T01:27:45.209Z
Lifecycle state	ACTIVE
Name	Allwinner
Project id	allwinner-164401
Project number	280303967737

F P G C P
E □



Google Cloud Platform Allwinner

API Manager Dashboard

API	Requests	Errors	Error ratio	Latency, median	Latency, 98%	
BigQuery API	-	-	-	-	-	Disable
Google Cloud APIs	-	-	-	-	-	Disable
Google Cloud Datastore API	-	-	-	-	-	Disable
Google Cloud IoT API Private API	-	-	-	-	-	Disable
Google Cloud Pub/Sub API	-	-	-	-	-	Disable
Google Cloud SQL	-	-	-	-	-	Disable
Google Cloud Storage	-	-	-	-	-	Disable
Google Cloud Storage JSON API	-	-	-	-	-	Disable
Google Service Management API	-	-	-	-	-	Disable
Stackdriver Debugger API	-	-	-	-	-	Disable

IAM F E API
D C I A G

Set IAM policy on project

wangxiao@allwinertech.com has set the project's IAM policy
April 19, 2017 at 6:40:54 PM UTC+8

User	wangxiao@allwinertech.com
Resource name	projects/allwinner-164401
Added pubsub.publisher	servi...lou...@allwinertech.com

C F IAM
D C I A G



Create device registry

wangxiao@allwinertech.com created my-registry-id
April 19, 2017 at 6:56:30 PM UTC+8

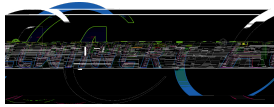
User	wangxiao@allwinertech.com
Resource name	projects/allwinner-164401/locations/us-central1/registries/my-registry-id
Request	
Device registry	
Default monitoring config	MONITORING_ENABLED
Id	my-registry-id
Parent	projects/allwinner-164401/locations/us-central1
Response	
Default monitoring config	MONITORING_ENABLED
Id	my-registry-id
Name	projects/allwinner-164401/locations/us-central1/registries/my-registry-id

 F C

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O C I A G

B G C I I C I A G



C D G

1 Download Tina Linux from GitHub or FTP server

L R G H A
I

```

$ curl https://raw.githubusercontent.com/tinalinux/repo/stable/repo > ~/bin/repo
$ chmod +x ~/bin/repo
$ export PATH=$PATH:~/bin/
$ mkdir tina && cd tina
$ repo init -u https://github.com/tinalinux/manifest -b r18-v0.9 -m r18/v0.9.xml
$ repo sync
$ repo start r18-v0.9 --all

```

F C F C L
C DK C DN

```

$ curl https://code.csdn.net/tinalinux/repo/blob/stable/repo > ~/bin/repo
$ chmod +x ~/bin/repo
$ export PATH=$PATH:~/bin/
$ mkdir tina && cd tina
$ repo init -u https://code.csdn.net/tinalinux/manifest.git -b r18-v0.9 -m r18/v0.9-csdn.xml
$ repo sync
$ repo start r18-v0.9 --all

```

F D L C DN C

2 Necessary modules needed by Google Cloud IoT demo on Tina SDK

P L
O L DK M



DK

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```
You're building on Linux
Lunch menu... pick a combo:
1. octopus_dev-tina
2. octopus_dev-dragonboard
3. tulip_m64-tina
4. tulip_m64-dragonboard
5. astar_evb-tina
6. tulip_pine64-tina
7. tulip_pine64-dragonboard
8. octopus_sch-tina
9. octopus_sch-dragonboard
```

N I

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M

P

G C I

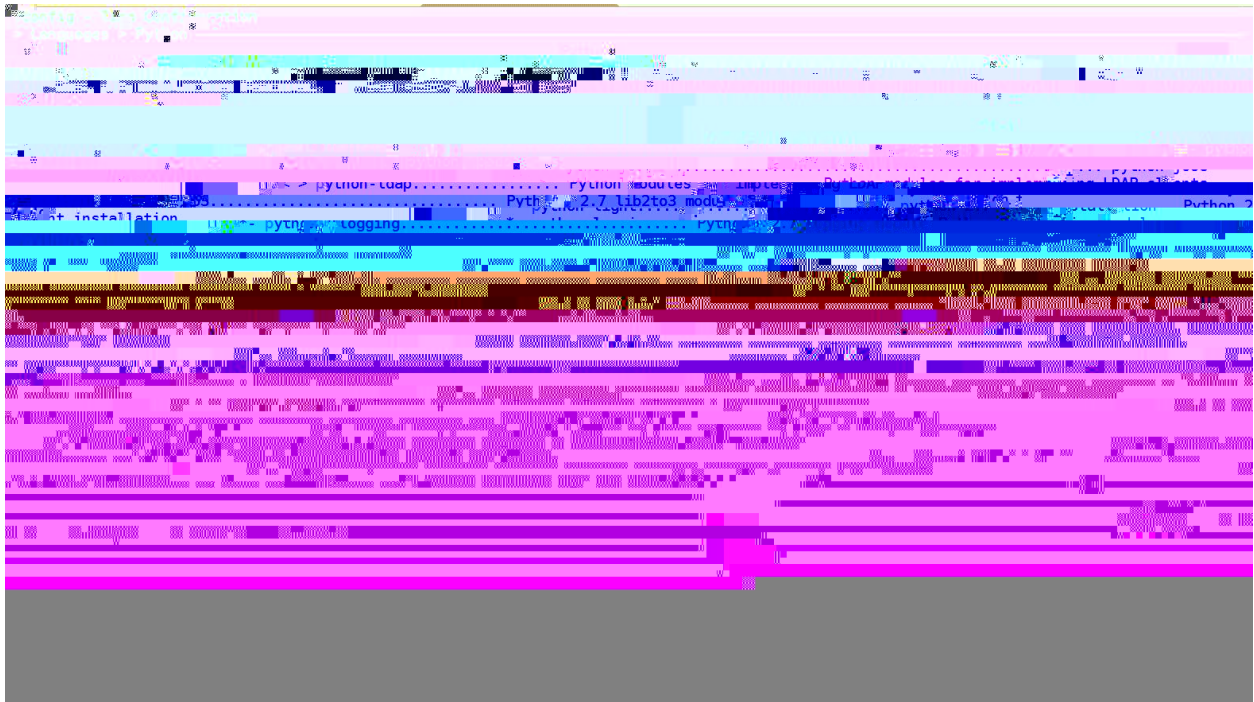
```
.config - Tina Configuration
> Languages > Python

Python
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are hotkeys. Pressing
<Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, </> to toggle search, <?> for help, <O> for options.
[ ] excluded <P> module <S> module capable

Python
-> python..... Python 2.7 programming language
-> python-attrs..... python-attrs
-> python-base..... Python 2.7 interpreter
-> python-cffi..... pycffi

SPACES
```

F N P



F N P

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, AP

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ARCH

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F RL

RL



```
config - Linux/arm64 3.10.65 Kernel Configuration...
device drivers -> Wireless LAN
Wireless LAN
Array keys navigate the menu. <Enter> selects submenus ---. Highlighted letters are hotkeys.

<> Wireless RNDIS USB support
[ ] Enable WiFi control function abstraction
<> Atheros Wireless Cards --->
<> Broadcom FullMAC wireless cards support
<> Broadcom IEEE802.11n embedded FullMAC WLAN driver
<> IEEE 802.11 for Host AP (Prism2/2.5/3 and WEP/TKIP/CCMP)
<> Marvell 8xxx Libertas WLAN driver support
[ ] TI Wireless LAN support --->
<> Marvell WiFi-Ex Driver
<> Realtek 8188E USB WiFi
<M> Realtek 8723B SDIO or SPI WiFi
<> Radio WLAN support --->

<Select> <Exit> <Help> <Save> <Load>
```

E F R
R L



```

          F
F  B      P M          F      AP
  LAN
      C      B      F MAC      M

```



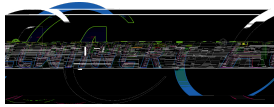
```

.config - Linux/arm64 3.10.65 Kernel Configuration
> Device Drivers > Network device support > Wireless LAN
Wireless LAN
Arrow keys navigate the menu. <Enter> selects submenus ---. Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes,
<M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ] excluded <M> module
< > module capable

--- Wireless LAN
< > USB ZD1201 based Wireless device support
< > Wireless RNDIS USB support
[ ] Enable WiFi control function abstraction
< > Atheros Wireless Cards --->
[*] Broadcom BCM43XX wireless cards support
(/lib/firmware/fw_bcm43xx.bin) Firmware path (NEW)
(/lib/firmware/nvram.txt) NVRAM path (NEW)
Enable Chip Interface (SDIO bus interface support) --->

```

	F		B		F	MAC
M		F	/		N	RAM /
	C		I	/	I	B I



```
confi ~ linux/arm64 # 2.03.05 kernel configuration
device Drivers > network device support > irqpoll Y https://www.kernel.org/doc/html/latest/irq/irqpoll.html

Interrupt type
Use the arrow keys to navigate this window or press the Tab key of
the item you wish to select, followed by the <SPACE> key. Press
*? for additional information about this option.

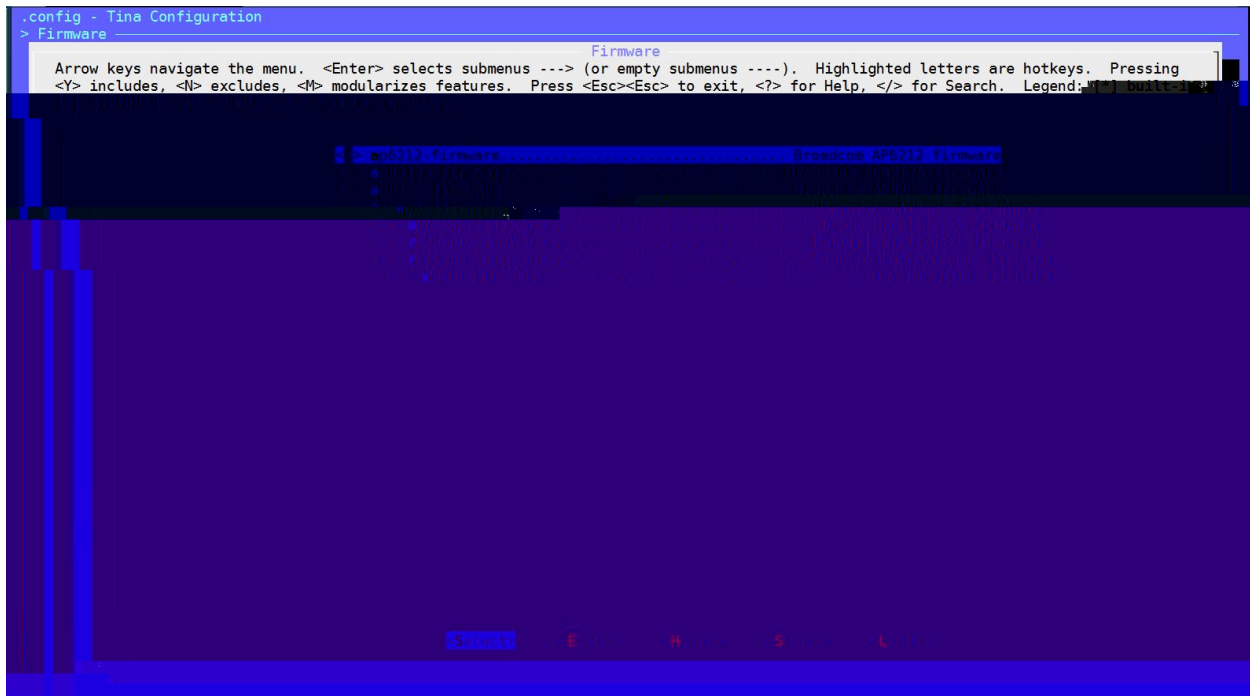
[ ] Out-Of-Band Interrupt
[ ] InBand Interrupt

Select Y h q
```

F C I B I



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AP
F
AP
K



B F AP F I

E

G C I

PC

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```
.config - Tina Configuration
> Utilities
Utilities
  Array keys navigate the menu. <Enter> selects submenus --> (or empty submenu -->). Highlighted letters
  are the only ones that will work.
  <Tab> and <Shift-Tab> toggle between the left and right hand side of the menu.
  <Space> will toggle a menu item if it is a boolean type.
  <Y> or <N> will answer yes or no to a question if it is a boolean type.
  <F1> will show this help text.

  .. set up and control loop devices
  > lrzsz..... X,Y and Z-modem protocols
  > maccalc..... MAC address calculation
  > mcookie..... generate magic cookies for xauth
  > mdadm..... A tool for managing Soft RAID under Linux
  > memtester..... Userspace utility for testing the memory subsystem for faults
  > mount-utils..... related (u)mount utilities
  > mountd..... OpenWrt automount daemon
  > mtd-utils..... Utilites for flash information
  > nmap..... TCP/IP scanner
  > nmap..... follow a pathname until a terminal point is found
  < > ocf-cryptools..... OCF-Linux cryptodev header
  < > opengles_demo..... OpenGL demo
  < > openldap-utils..... LDAP implementation (utilities)
  < > openssl-util..... Open source SSL toolkit (utility)
  < > ppp..... Simple PPP/ATM/6-ppp
```

F

3 Compile the Tina Linux and flash the firmware on board

```
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```
make[2]: Leaving directory `/home/wangxiao/workspace/tina_2.0'
make[1]: Leaving directory `/home/wangxiao/workspace/tina_2.0'

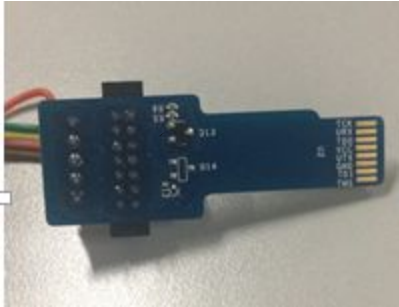
#### make completed successfully (44 seconds) ####
```

F



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```
/home/wangxiao/workspace/tina_2.0/out/tulip-d1/tina_tulip-d1_card0.img  
pack finish
```

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4 Run Google Cloud IoT Demo on Tina

A O P

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```
BusyBox v1.24.1 () built-in shell (ash)
[ 8.110129] CPU1: shutdown
[ 8.113114] psci: CPU1 killed.

Tina is Based on Openwrt!
-----
Tina Linux (Neptune, 587479EB)
-----
root@TinaLinux:/#
root@TinaLinux:/#
root@TinaLinux:/#
root@TinaLinux:/#
root@TinaLinux:/#
root@TinaLinux:/# echo 4 > /proc/sys/kernel/printk
printk_ratelimit
printk_delay          printk_ratelimit_burst
root@TinaLinux:/# echo 4 > /proc/sys/kernel/printk
root@TinaLinux:/# python
Python 2.7.11 (default, Apr 17 2017, 07:00:02)
[GCC 5.2.1] on linux2
Type "help", "copyright", "credits" or "license" for more information.
|>>> █ ,
```

F P
C I R W PA ORD
F ID P

```
root@TinaLinux:/# wifi_connect_ap_test "SSID" "PASSWORD"
*****
***Start wifi connect ap test!***
*****
wpa_supplicant not running!
ctrl_interface != /etc/wifi/sockets
```

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adb h oo em

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```
root@TinaLinux:/# python google.py --project_id=allwinner-164401 --registry_id="my-registry-id" --device_id="my-rs256-device-id" --private_key_file="/usr/rsa_private.em" --algorithm=RS256
Creating JWT using RS256 from private key file /usr/rsa_private.em
Publishing message 1/100: 'my-registry-id/my-rs256-device-id-payload-1'
on_connect 0: No error.
Publishing message 2/100: 'my-registry-id/my-rs256-device-id-payload-2'
on_publish
on_publish
Publishing message 3/100: 'my-registry-id/my-rs256-device-id-payload-3'
on_publish
Publishing message 4/100: 'my-registry-id/my-rs256-device-id-payload-4'
on_publish
Publishing message 5/100: 'my-registry-id/my-rs256-device-id-payload-5'
on_publish
Publishing message 6/100: 'my-registry-id/my-rs256-device-id-payload-6'
on_publish
Publishing message 7/100: 'my-registry-id/my-rs256-device-id-payload-7'
on_publish
Publishing message 8/100: 'my-registry-id/my-rs256-device-id-payload-8'
on_publish
Publishing message 9/100: 'my-registry-id/my-rs256-device-id-payload-9'
```

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```
Publishing message 72/100: 'my-registry-id/my-rs256-device-id-payload-72'  
on_publish  
Publishing message 73/100: 'my-registry-id/my-rs256-device-id-payload-73'  
on_publish  
Publishing message 74/100: 'my-registry-id/my-rs256-device-id-payload-74'  
on_publish  
Publishing message 75/100: 'my-registry-id/my-rs256-device-id-payload-75'  
on_publish  
Publishing message 76/100: 'my-registry-id/my-rs256-device-id-payload-76'  
on_publish  
Publishing message 77/100: 'my-registry-id/my-rs256-device-id-payload-77'  
on_publish  
Publishing message 78/100: 'my-registry-id/my-rs256-device-id-payload-78'  
on_publish  
Publishing message 79/100: 'my-registry-id/my-rs256-device-id-payload-79'  
on_publish  
Publishing message 80/100: 'my-registry-id/my-rs256-device-id-payload-80'  
on_publish  
Publishing message 81/100: 'my-registry-id/my-rs256-device-id-payload-81'  
on_publish  
Publishing message 82/100: 'my-registry-id/my-rs256-device-id-payload-82'  
on_publish  
Publishing message 83/100: 'my-registry-id/my-rs256-device-id-payload-83'  
on_publish  
Publishing message 84/100: 'my-registry-id/my-rs256-device-id-payload-84'  
on_publish  
Publishing message 85/100: 'my-registry-id/my-rs256-device-id-payload-85'  
on_publish  
Publishing message 86/100: 'my-registry-id/my-rs256-device-id-payload-86'  
on_publish  
Publishing message 87/100: 'my-registry-id/my-rs256-device-id-payload-87'  
on_publish  
Publishing message 88/100: 'my-registry-id/my-rs256-device-id-payload-88'  
on_publish  
Publishing message 89/100: 'my-registry-id/my-rs256-device-id-payload-89'  
on_publish  
Publishing message 90/100: 'my-registry-id/my-rs256-device-id-payload-90'  
on_publish  
Publishing message 91/100: 'my-registry-id/my-rs256-device-id-payload-91'  
on_publish  
Publishing message 92/100: 'my-registry-id/my-rs256-device-id-payload-92'  
on_publish  
Publishing message 93/100: 'my-registry-id/my-rs256-device-id-payload-93'  
on_publish  
Publishing message 94/100: 'my-registry-id/my-rs256-device-id-payload-94'  
on_publish  
Publishing message 95/100: 'my-registry-id/my-rs256-device-id-payload-95'  
on_publish  
Publishing message 96/100: 'my-registry-id/my-rs256-device-id-payload-96'  
on_publish  
Publishing message 97/100: 'my-registry-id/my-rs256-device-id-payload-97'  
on_publish  
Publishing message 98/100: 'my-registry-id/my-rs256-device-id-payload-98'  
on_publish  
Publishing message 99/100: 'my-registry-id/my-rs256-device-id-payload-99'  
on_publish  
Publishing message 100/100: 'my-registry-id/my-rs256-device-id-payload-100'  
on_publish
```

O F D L
MQ
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```
[Secret-Ca...le:~ Wang$ gcloud subscriptions pull --auto-ack projects/allwinner-164401/subscriptions/my-subscription
```

DATA	MESSAGE ID	ATTRIBUTES
registry-id/my-rs256-device-id-payload-66	121017144547	device-id my-rs256-device-id deviceNumId=2647740481950093 deviceRegistryId= registry-id deviceRegistryLocation=us-central1 projectId=allwinner-164401 subFolder=

F

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