



RouterCheck Installation and Usage

February 16, 2015

Sericon Technology Inc.

71 Marquette Ave.
Toronto, Ontario
M6A 1X8

Phone: 416.781.3988

E-mail: smithsa@sericontech.com

SERICON[™]
technology

No part of this document may be reproduced, copied,
or distributed in any fashion without the express written
permission of Sericon Technology Inc.

Copyright © 2015 by Sericon Technology Inc.

Contents

1 Introduction	3
1.1 Requirements.....	3
1.2 Limitations	3
1.2.1 Bad User Interface.....	3
1.2.2 Tablet > SmartPhone.....	4
1.2.3 The RouterCheck Server should be running	4
1.2.4 IPv4	4
1.2.5 Use RouterCheck on a home network.....	4
1.2.6 Languages	5
2 Installation.....	6
3 Running RouterCheck.....	7
4 Making sense of the results.....	9
4.1 Router Information	9
4.2 Wireless Security.....	9
4.3 Administrator Password	9
4.4 Open Ports	10
4.5 Pingable.....	10
4.6 DNS	10
4.7 Vulnerability Database	11
4.8 Tested Vulnerabilities.....	11
5 Troubleshooting	12
5.1 Reinstall RouterCheck.....	12
5.2 Let us know about the problem	12
5.3 Turn on debug	13
6 Feedback.....	15
6.1 Test Environment	15
6.2 Experience using RouterCheck	15
6.3 User Experience	15
6.4 Anything Else?.....	16

1 Introduction

RouterCheck is a tool for checking the security of home routers. It currently runs as an Android application and communicates with a server in the cloud to test all aspects of your network, both inside and out.

This document is a guide for how to install and run RouterCheck.

1.1 Requirements

Before running RouterCheck ensure that you have the following:

- A connection to a network that you have permission to test on. This network should contain the router that will be tested.
- An Android device that runs at least Android 3.0 (Honeycomb). That means pretty much any reasonably modern device that runs Android. It's preferable to run RouterCheck on a tablet rather than a phone.
 - We've tested RouterCheck on several Android devices up to and including Android 5.0 (Lollipop).

1.2 Limitations

RouterCheck is still being developed and improving daily. Still, there are some things that you'll have to allow for:

1.2.1 Bad User Interface

Yes, we know, the user interface on our Android application is pretty bad. It will get better, trust us. Why so bad? Well we could say that we've spent most of our time making the server backend rock solid: Fault tolerant, scalable, secure, etc etc. And we'd be telling the truth,

But we'd rather say that we've really internalized the credo of Reid Hoffman, the founder of LinkedIn who says:

If you are not embarrassed by the first version of your product, you've launched too late.

1.2.2 Tablet > SmartPhone

You know that our user interface is lousy, so please don't expect that we've gone to the trouble of designing it and testing it for different screen sizes. We usually run RouterCheck on a tablet (and in Landscape mode), so for your best user experience, we would recommend the same.

If you do run RouterCheck on a phone, there will probably be some text overruns and other things that don't look perfect. This will be fixed in the future.

1.2.3 The RouterCheck Server should be running

Since we're not in full production mode quite yet, there may be times when the RouterCheck Server goes offline. RouterCheck will still work during these times, but some of the tests which must be launched from outside of the network will obviously not be done.

To determine whether the Server is currently running, you can go to the RouterCheck download page <http://www.routercheck.com/download-routercheck/> and click on the link provided.

1.2.4 IPv4

Right now, RouterCheck sees the world as an IPv4 network. If you're running things over IPv6, RouterCheck will have some trouble with this. Of course, this will change in the future.

And yes, we are impressed that you're running an IPv6 network at home.

1.2.5 Use RouterCheck on a home network

While you can use RouterCheck on any network, there are limited tests that RouterCheck can perform on a corporate network. This is due to the fact that a typical router in a corporate setting will not respond to requests that are made from a non-administrator computer.

1.2.6 Languages

Router vulnerabilities do not know national boundaries, so making RouterCheck a fully internationalized product was a major design goal. RouterCheck was designed and built to accommodate all aspects of internationalization, and it supports languages that use non-Latin character sets, double-byte Asian characters, and languages that are bi-directional. Internationalized support exists in the RouterCheck app, the Server, and in all of the data communication.

RouterCheck currently supports 36 different languages. These languages were machine translated, so native-quality translation cannot be expected. If you know one of the languages and wish to test it, we'd appreciate any feedback on that translation.

2 Installation

RouterCheck can be installed from the Google Play Store by going to <https://play.google.com/store/apps/details?id=com.Sericon.RouterCheck.client.android>.

3 *Running RouterCheck*

When you run RouterCheck, you're testing the router and network that you're running on. So before you begin, make sure that you're connected to a network that you have permission to test.

1. Start RouterCheck by clicking on the RouterCheck icon. You can find the icon in the installed apps list if it hasn't been placed on your Android home page.
2. If this is the first time you're running RouterCheck, you need to register it by entering your email address. Enter your email address and tap *Register*. This only needs to be done the first time. You may also choose to run RouterCheck in a language other than English. Simply choose one from the list provided.
3. RouterCheck will start up and attempt to connect to the RouterCheck Server that's running in the cloud.
4. After RouterCheck initializes, a message will be displayed. This message is generated by the server and can be broadcast to all users (e.g. to provide general system status), or tailored for a specific user (e.g. to make a special offer just for that user or to inform him that many users from his ISP have recently been attacked and he should be on alert).
5. To start checking your router, tap *Check My Router*
6. If this network has never been checked before, you need to provide some information about the type of network it is (i.e. a network in your home, a network at the coffee shop, etc.). This is actually an important step because security provided by the router is handled differently depending on the type of network: WiFi encryption, vs. guest login, vs. completely open system.
7. RouterCheck will ask for your permission to run the test because it is going to try to access the network from the outside.
8. RouterCheck will begin to run. It goes through several stages:
 - a. **Responsiveness** – RouterCheck will attempt to interact with the router to see if it responds to any requests. Since we're inside of the firewall, it should.
 - b. **Password** – RouterCheck will attempt to login to the router using default and common passwords.
 - c. **Server** – The RouterCheck Server will look at the network from outside of the firewall to find vulnerabilities.

9. Once it's finished, RouterCheck will display the status screens. Each line in the screen is color coded (Red = bad, Yellow = caution, Green = good, Blue = Untestable).
10. Each line may be clicked on to get more information. Currently, we have all of the data that needs to be gathered – we do need to provide more information about what the errors really mean, and how they should be fixed.

4 Making sense of the results

After checking your router, you may look at the status screen provided to get a general idea of how the test went. Each section may be clicked on to get more information.

4.1 Router Information

The Router Information screen shows you all of the information that RouterCheck was able to determine about your router. If some of the information is missing, it might be valuable to us if you sent us as much information about the router as possible.

4.2 Wireless Security

Wireless security helps keep unwanted people from connecting to your network. It provides the “Wi-Fi Password” that you must use when connecting to a new network. There are different levels of encryption available, and they may or may not be very secure.

WEP and WPA are older security protocols that are now considered to be outdated. Hackers know how to defeat them, so if your network relies on these to provide security, this will be flagged by RouterCheck.

WPA2 is currently considered the best choice for wireless security, and should definitely be used.

WPS (Wi-Fi Protected Setup) is used by many router vendor to help make the process of setting up a home network much easier. Unfortunately, hackers have discovered a flaw in the protocol which makes breaking it quite simple. If your router allows you to turn this feature off (many do), it is advisable to do so.

4.3 Administrator Password

The router’s Administrator Password stops hackers from gaining access to the administration features of your router, so a strong password is very important. Unfortunately, many people leave the router’s default password turned on, or use a simple or trivial password such as *password* or *qwerty*.

RouterCheck will check for these things, and flag them if found.

4.4 Open Ports

RouterCheck looks to see if a network has any open ports (also sometimes called port forwarding). This allows people on the internet to connect to specific services being run by computers in the home. If done improperly, it's fairly dangerous.

Ports can sometimes be opened in order to play games, or to allow for something like Remote Administration to be used.

If RouterCheck finds that there are open ports in your network and you don't know why they're open, it's important that you close them as soon as possible.

4.5 Pingable

"Ping" is an internet tool that allows one computer to determine if another is up and running. It's typically used in a corporate environment by IT staff trying to track down network problems. It really has very limited use in a home network, although many home networks will respond to Ping requests.

This is a problem because many hackers will use Ping as a way to find potential targets. Not responding to Pings means that your network is not as easy for hackers to find.

RouterCheck reports whether the router responds to Pings. If it does and the router allows you to turn this feature off, you should do so.

4.6 DNS

DNS is the system that turns website addresses (like www.google.com) into the numerical addresses that computers use to find each other. It's critical for the infrastructure of the internet, and a very important part of the running of a healthy home network. It's also a very popular thing for hackers to attack when compromising routers because it allows even more attacks to occur.

RouterCheck tests the DNS of a network by looking at the DNS servers that have been configured to provide service for the network. If a rogue DNS server has been configured, RouterCheck will flag it as a problem and suggest that the user fix it.

However, many routers make things a bit difficult by running their own DNS server which hides the upstream server that they use. Using currently available tools, there's no way to determine whether "that" server is legitimate or not, and so we mark this entry

with a caution. However, we're currently working on some proprietary methods to determine the complete security picture for a network's DNS system.

4.7 Vulnerability Database

RouterCheck uses several databases of device vulnerabilities (such as the CVE – Common Vulnerabilities and Exposures <https://cve.mitre.org/>) to help determine the vulnerabilities that your router has. When RouterCheck finds a vulnerability for the router being tested in a database, it's reported here.

If this list of vulnerabilities is empty, it by no means indicates that the device is flawless. There can be many reasons why one router shows up but another one doesn't. A good example is popularity – the more popular a vendor and/or model is, the more attention it will get from the hacker community looking for ways of breaking in. This means that more obscure models aren't necessarily more secure, they just haven't been examined to the extent that the bigger names have.

4.8 Tested Vulnerabilities

Besides looking at static databases as listed above, RouterCheck will also actively look for traces of vulnerable behavior by interacting with routers and report on them on this screen.

Because these checks are being done on the RouterCheck server, they can be added to and improved upon without needing to update the RouterCheck app. In doing so, the app becomes more powerful.

An example check that's being done is for the “Misfortune Cookie” vulnerability that was disclosed by Check Point researchers in December 2014 (<http://mis.fortunecook.ie/>). This vulnerability affects millions of routers from different vendors, and exposes the networks that use them to real problems.

RouterCheck analyzes whether your router is susceptible to this problem and will report on it.

5 Troubleshooting

Sometimes problems are going to happen with software. If they do happen, here are the things that you can try:

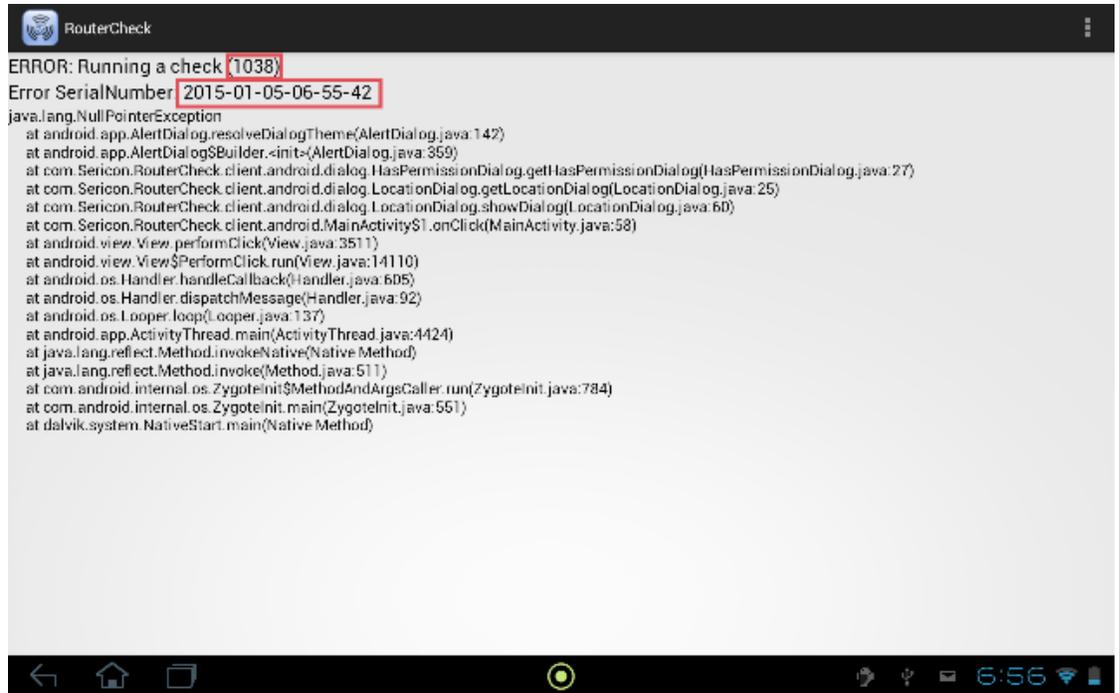
5.1 Reinstall RouterCheck

The problem may be caused by your installation of RouterCheck. As a first step, we'd suggest a complete reinstall from scratch. To do this:

- 1 Uninstall the RouterCheck app from your Android device. This may be done by going to **Settings** / **Apps** and clicking on RouterCheck and then pressing the **Uninstall** button.
- 2 Using a file manager, go to the /mnt/sdcard/RouterCheck folder and remove everything.
- 3 Install RouterCheck as was described earlier in this document.

5.2 Let us know about the problem

If you encounter a problem while running RouterCheck, you can always reach us at beta@RouterCheck.com. When writing, please describe what happened as best you can. If you've received an error screen, please include information from it:



```

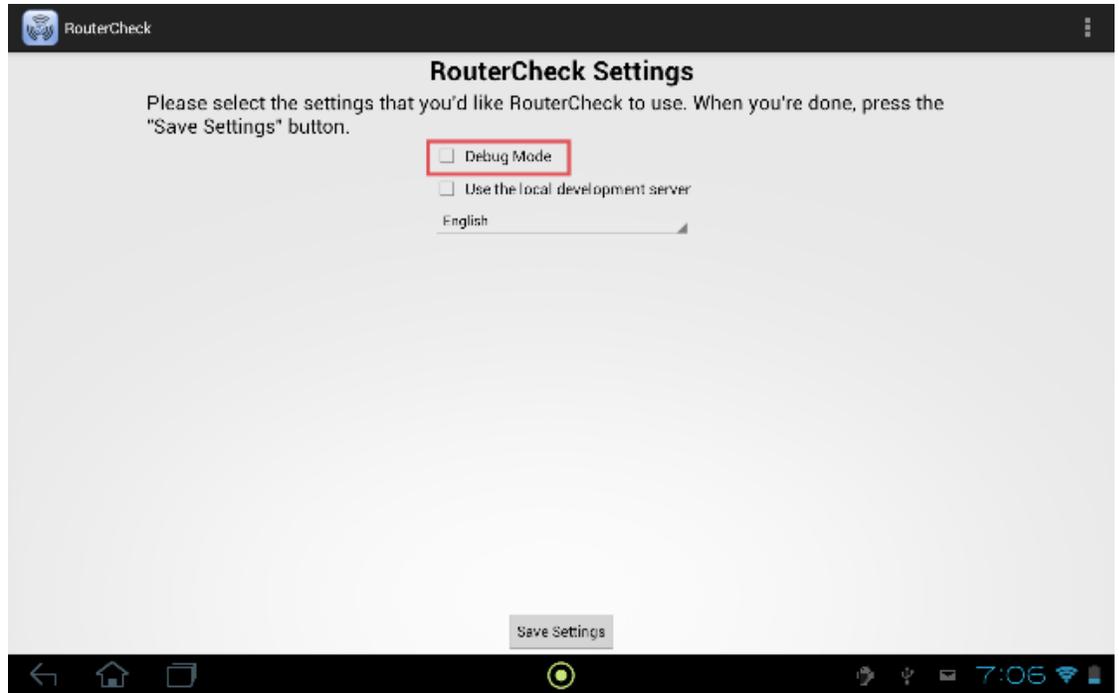
RouterCheck
ERROR: Running a check (1038)
Error SerialNumber 2015-01-05-06-55-42
java.lang.NullPointerException
    at android.app.AlertDialog.resolveDialogTheme(AlertDialog.java:142)
    at android.app.AlertDialog$Builder.<init>(AlertDialog.java:359)
    at com.Sericon.RouterCheck.client.android.dialog.HasPermissionDialog.getHasPermissionDialog(HasPermissionDialog.java:27)
    at com.Sericon.RouterCheck.client.android.dialog.LocationDialog.getLocationDialog(LocationDialog.java:25)
    at com.Sericon.RouterCheck.client.android.dialog.LocationDialog.showDialog(LocationDialog.java:60)
    at com.Sericon.RouterCheck.client.android.MainActivity$1.onClick(MainActivity.java:58)
    at android.view.View.performClick(View.java:3511)
    at android.view.View$PerformClick.run(View.java:14110)
    at android.os.Handler.handleCallback(Handler.java:605)
    at android.os.Handler.dispatchMessage(Handler.java:92)
    at android.os.Looper.loop(Looper.java:137)
    at android.app.ActivityThread.main(ActivityThread.java:4424)
    at java.lang.reflect.Method.invokeNative(Native Method)
    at java.lang.reflect.Method.invoke(Method.java:511)
    at com.android.internal.os.ZygoteInit$MethodAndArgsCaller.run(ZygoteInit.java:784)
    at com.android.internal.os.ZygoteInit.main(ZygoteInit.java:551)
    at dalvik.system.NativeStart.main(Native Method)

```

When writing, please include the error identifier and the error serial number which will help us to track the problem down.

5.3 Turn on debug

If we instruct you to, turn on Debug Mode by going to the RouterCheck Settings and clicking the Debug Mode checkbox.



Doing this will allow RouterCheck to produce log files that will help us track down your problem.

6 Feedback

Of course, it's important for you to help us build better products for you. To do that, your feedback on what we've done so far is invaluable.

Please direct any feedback you have to us at beta@RouterCheck.com. We appreciate all comments that help us make the product better.

Things you might include with your comments:

6.1 Test Environment

- What router (vendor and model) did you test with RouterCheck?
- What type of device were you using to run RouterCheck on?

6.2 Experience using RouterCheck

- Did RouterCheck find any issues with your router that you weren't already aware of?
- Did using RouterCheck cause you to modify how you configure your router?
- Did you encounter any problems?
- What other tests would be beneficial?

6.3 User Experience

- How would you make RouterCheck easier to use?
- What things did you not understand?
- If you chose to run in a non-English language, was the translation good?

6.4 Anything Else?

- What else should we know to make RouterCheck a better product?