Greetings NetSteppers. In this CCNA video cheat sheet we will be covering cabling: specifically, straight through, crossover, roll over and serial cables.

To connect any device, you need an interface, a connector and a cable.

Let's look at the forest slide. In the upper left hand corner we have a picture of an unshielded twisted pair or UTP cable. The UTP cable is not one solid think copper cable. It is actually made up of eight smaller copper cables all held together by an outer sheath. Each copper cable is paired together with another copper cable forming a pair, so instead of eight individual cables you have four pairs. The individual cables that make up a pair are twisted around one another. For example, the solid blue and half blue/white cable pair is twisted around one another for the length of the cable. By twisting the cable pairs in this manner it cuts down on electro-magnetic interference or EMI. That is how it got the name unshielded twisted pair.

In the upper right hand corner we have a picture of an RJ-45 termination connector. RJ-45 connectors are used to terminate UTP cables in RJ-45 interfaces. They can also terminate other copper cable types but we will remain focused on UTP cable. UTP cable and RJ-45 termination connector are traditionally used in Ethernet networks but can be used for other connection types.

In the lower middle we have a picture of the DB-60 serial cable. Traditionally this cable and termination type was utilized in WAN connectivity. The cable gets its name from the sixty pins on the male end of the connection or the 60 receptacles on the female end.

\*\*\*\*New Slide\*\*\*\*

Let's dig a little deeper and look at the tree slide. The picture on the left is an example of a straight through cable. You now see the twisted pairs broken out into individual troughs. Also this slide gives you some insight into how the RJ-45 connector works.

Looking at the upper left picture, the left RJ-45 connection, you may notice that position one (the white and green striped cable) corresponds with position number one on the right RJ-45 connector. Continuing with the upper left picture, the left RJ-45 connection position number two (the solid green cable) corresponds with position number two on the right RJ-45 connector. This pattern continues for the rest of the cable positions three through eight. Even though the pairs are twisted inside the cable the correct position on one end matches the same position on the other end. That is why it's called a straight through cable. If this is still not clear, the left side of the lower picture also demonstrates a straight through cable.

The picture on the right is an example of a crossover cable. Same cable, same RJ-45 termination connector, different termination end points. Where a straight through cable went straight through (position one to position one) a crossover cable crosses the transmit and receive pairs. Looking at the upper right picture, the left RJ-45 connection, notice that position one (the white and green striped cable) corresponds with position number three on the right RJ-45 connector. Continuing with the upper right picture, the left RJ-45 connection position number two (the solid green cable) corresponds with the position number six on the right RJ-45 connector. In summary, a crossover cable connects position one to position three and position two to position six. Crossing the transmit and receive ends causes it to be called a crossover cable. If it is still not clear, the right side of the lower picture also demonstrates a straight through cable.

\*\*\*\*New Slide\*\*\*\*

When would you use a straight through cable vs. a crossover cable? The next tree level slide answers that question. On the left we have straight through cable examples. If you connect the switch to a router you need a straight through cable. If you connect a switch to a server you need a straight through cable. In most instances if you go from a device to an unlike device you need a straight through cable.

On the right we have crossover cable examples. If you connect a switch to a switch you need a crossover cable. If you connect a router to a router you need a crossover cable. In most instances, if you go from a device to any like device you need a crossover cable.

It all boils down to the transmit and receive connections on each end. If you connect a switch to a router they transmit and receive on different connections. Therefore, you have to use a straight through cable. If you connect a switch to a switch they transmit and receive on the same connection. Therefore, you have to use a crossover cable.

\*\*\*\*New Slide\*\*\*\*

The picture on the left is an example of a rollover cable. Same cable, same RJ-45 termination connector, different termination end points. Where a straight through cable went straight through (position one to position one) and a crossover cable crosses the two transmit/receive pairs, a rollover cable rolls every cable pair. Looking at the upper left picture, the left RJ-45 connection, you may notice that position one (the white and brown striped cable) corresponds with position number eight on the right RJ-45 connector. Continuing with the upper left picture, the left RJ-45 connection position number two (the solid orange cable) corresponds with the position number seven on the right RJ-45 connector. This pattern continues for the rest of the cable positions three through six. In summary a rollover cable literally rolls all of the RJ-45 positions.

The picture on the right is an example of a serial cable. These cable types are not as prevalent as they used to be. They would connect a router to an external telecommunications device known as a channel service unit or CSU. Today most CSU’s are built into the interface card therefore you don’t need this cable type. But you still need to know about it. Wink-Wink Nod-Nod, say no more.

\*\*\*\*New Slide\*\*\*\*

I want to stop and have a reality check. On this slide we will talk about the difference between academia and the real world.

In academia you need to know the difference between a crossover and straight-through cable.

In the real world most routers and switches contain logic to automatically detect the cable type (such as crossover cables) and allow them to function with other types of Ethernet devices.

In academia you need to know how a rollover cable works.

In the real world just about every device comes with a console (rollover) cable.

In academia you need to know about a DB-60 cable.

In the real world, what?????? I have not seen a DB-60 cable in 20 years. That does not mean they are still in use and if you have one in your network, I do not mean to offend. Most networks today have gone to Ethernet as there preferred transport.

As an aside, when I first got into this industry back when routers were made of stone, I worked at a very small enterprise (they had frame-relay and DB-60 connections by the way) and I was tasked to lab up some Ethernet connectivity solution. For two days I tried to get those connections to work and finally I went to the senior guy and he asked me “Are you using crossover cables to connect the switches together?” Nope, lesson learned!! At the next job, I was tasked once again to lab up an Ethernet solution and I spend a day creating the proper cables. The senior guy came by to check on me and asked “why are you doing that, the switches auto detect?” Sigh, lesson learned.

\*\*\*\*New Slide\*\*\*\*

Let's dig a little deeper and look at the leaf slide. It is now time to see what you have learned and introduce some specific concepts with the NetStep Challenge.

Assuming everything is IPed correctly, will these devices be able to ping each other?

\*\*\*\*New Slide\*\*\*\*

No. A crossover cable should have been used in place of the straight-through cable. You can’t go from device to like device with a straight-through cable.

Like to Like = Crossover

Like to Unlike = Straight-through

Is this information needed to pass the test? I am not saying …….. I am just saying

\*\*\*\*New Slide\*\*\*\*

Staying at the leaf level, we have another NetStep Challenge.

What kind of cable should be used to make each connection that is identified by the numbers 1 – 4?

\*\*\*\*New Slide\*\*\*\*

1. Ethernet straight-through cable
2. Ethernet straight-through cable
3. Serial cable
4. Rollover cable

Is this information needed to pass the test? I am not saying …….. I am just saying

\*\*\*\*New Slide\*\*\*\*

Staying at the leaf level, we have our final cabling NetStep Challenge.

To what type of port would a cable with a DB-60 connector attach?

\*\*\*\*New Slide\*\*\*\*

A Serial port.

Is this information needed to pass the test? I am not saying …….. I am just saying

\*\*\*\*New Slide\*\*\*\*

You now know enough about cabling to pass the CCNA ICND1 test. Always keep learning but take it step by step.