Your Route to Cisco® Career Success

by

Kevin Wallace

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Also, I am not responsible for any good or bad thing that happens to you as a result of what is advised in this book. In fact, the main idea behind this book is that your career is what you make of it.

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Introduction

Cisco Systems® is a Fortune 100 company and the leader in networking equipment. So, if you’re an information technology (IT) professional, you’re probably going to be encountering Cisco products on a regular basis. This book is all about how you can maximize your career working with Cisco products.

My name Kevin Wallace, and I help Cisco professionals master technologies, so that they can make a bigger impact and advance in their career.

As we begin, let me ask you, have you ever had any of the following challenges?

- You work on project after project, but at the end of the month or the end of the year, you don’t feel that you have a lot to show for all of your efforts.
- Maybe you have career goals, but life seems to keep getting in the way.
- Or perhaps you try to learn about new technologies, but you’re just not able to find a clear explanation to a specific question you have.

If those challenges in any way resonate with where you are in your career, I completely understand, because I was there. When I got my first IT job, I thought I was being hired to administer a telephone network, but “surprise!,” I was also asked to build a computer network from scratch.

It was back around 1989, when I first laid hands on a Cisco router. The router was a Cisco AGS+, running Cisco IOS® 7.x. At the time, I was the only guy in the networking department. So, I couldn’t lean on the knowledge of a coworker.

Fortunately, what I lacked a resources, I made up for in desire to learn. Recently out of college with an Electrical Engineering degree, I was a big fan of books on goal setting and personal development. My favorite author at the time was Zig Ziglar. Zig taught me about goal setting and motivation.

Using the resources I did have, I went on to create a very successful career in IT. For those of you familiar with Cisco certifications, I’m a dual Cisco Certified Internetwork Expert (CCIE), in the areas of Route/Switch and Voice. I was one of five Network Design Specialists at Walt Disney World in Florida. My publication credits include about fifteen books for Cisco Press, and I’ve been teaching others through live, on-line classes for the past twelve years for a Cisco Learning Partner (CLP).

Looking back, seven specific keys to a successful career as a Cisco professional become clear. In this book, I want to share those keys with you. Here they are at a super high level:

1. **Goals, Your Destination Address**: We need a consistent practice of creating, planning for, and attaining goals.
2. **When Life Gets in the Way**: This key is all about staying on track towards our goals when life serves up its inevitable distractions.
3. **The Curiosity Key**: Cultivating a strong curiosity helps us stay motivated.
4. **Time Alchemy**: There are tons of books today on time management, and we’ll contrast a couple of the popular approaches out there today. Also, we’ll offer a few tips to get you started.
5. **Tomes of Wisdom**: With the availability of e-books, it’s easier than ever to have an awesome technical library. We’ll also practice navigating Cisco’s on-line documentation.

6. **Getting Your Hands Dirty**: Theory is great, but there’s no substitute for hands-on experience. We’ll discuss options for getting your hands on some equipment.

7. **A Certified Success**: Possessing appropriate certifications can help open doors in your IT career.

Some of the most common mistakes people in the IT industry make include:

- Getting caught up in reaction to problems and not taking the time to proactively grow
- Losing the enthusiasm and curiosity they had at the beginning of their career
- Relying too much on others, and not doing the “heavy lifting” themselves

If this sounds like something you’re interested in, then let’s get started with the first key. It’s all about goal setting.

Just like a packet we’re routing through a network has a destination IP address, goals give our careers a destination address, along with the “next hop” addresses along the way.
Chapter 1: Goals, Your Destination Address

If you get into your car and drive for a couple of hours, making the occasional turn, and taking the occasional detour, you will end up somewhere. However, the destination at which you find yourself might not be where you want to be.

What if, instead, you predetermined your destination, planned your route, and maybe even entered your desired destination into your car’s navigation system? At the end of two hours, you would either have already arrived at your destination, or you would be on target to reach your destination.

The same thing can happen with our careers. We can just show up for work each day; chat with our co-workers; respond to any urgent demands (e.g. figuring out why a printer isn’t printing); and work on whatever project we’ve been assigned. While there’s nothing wrong with chatting with our coworkers, responding to urgent demands, or working on our projects, they don’t give much direction to our career, and there is relatively little growth involved.

This discussion reminds me of a time when I was a network manager at a university, and my director was considering giving a promotion to an employee in a different department than mine, and he was asking for my input in the decision. My director told me, “He’s got eleven years of experience.” To that, I responded, “No. He’s got one year of experience, eleven times.”

When asked to explain my comment, I pointed out that this person had been doing the same thing, day after day, year after year. There was no growth in their career. They hadn’t proactively sought out additional training or certifications. They just did the same things, over and over.

At this point, you might be wondering, “So how do I grow in my career? After all, I have to do the same things day after day. It’s my job!” My one word answer to that question is, “goals.”

A clearly defined goal can give tremendous direction and motivation to your daily activities. For example, let’s say you’ve set a goal to become a Cisco Certified Network Associate (CCNA), and you’ve purchased a couple of Cisco Press books on the subject. One evening, you read about Spanning Tree Protocol (STP), and the next day at work you’re curious about how STP is implemented in your network. You issue a few `show spanning-tree` commands to determine which switch is acting as the root bridge. This teachable moment, where you gained a deeper understanding of STP, was a result of having a goal to achieve your CCNA certification.

To be a bit more clinical, when your brain focuses on something (i.e. STP in our example), it develops a sensory acuity to that thing (i.e. the brain is more likely to notice that thing). This means, if you’re studying a particular topic, you are subconsciously looking for things related to that topic in your environment.

You should strategically set short-term goals to pave the way to long-term goals. So, if you’re just getting started in the Cisco networking world, you might have a long-term goal of becoming a CCIE. That’s a very worthy goal. But since it’s so far off, it’s easy to lose your drive, unless you have very attainable short-term goals along the way.
Now, let’s get down to the business of actually setting our goals. Personally, I’ve been reading personal development material, including a ton of goal setting techniques, for 25 years. The two personal development authors that impacted me the most are Zig Ziglar and Anthony Robbins. I’ve read their books, attended their seminars (including a fire walk at one of Anthony Robbins’ events), and got to meet them personally. If you want an in-depth look at their goal setting processes, I recommend the following books:

- See You at the Top, by Zig Ziglar
- Awaken the Giant Within, by Anthony Robbins

However, I don’t want you to have to wait to get started. So, let’s look at a basic goal setting process you can take action on right now.

**Step 1: Dream**

Find a comfortable place where you can relax and not be disturbed for a few minutes. Close your eyes, and take a few nice deep breaths. Now, think about how you want your career to look in five years. For example, if you’re 27 years old when you’re reading this, think about the 32 year-old you, and answer the question, “What type of position do I want in five years?”

For example, do you want to be in management, or do you want to be very hands-on? Do you want to focus on network design, or is implementation/troubleshooting more your style? Do you want to specialize in a particular area, such as route/switch, voice, security, wireless, data center, service provider, or something else?

Whatever you want your career to be like in five years, write it down. This is your long-term goal.

**Long-term Goal:**

________________________________________

**Step 2: Future Pace**

“Future pace” is a Neuro-Linguistic Programming (NLP) term that refers to seeing future results as if they’ve already happened. As you think about your career in five years, vividly imagine that you’re already in that position. Now (here’s the really important part), look back over the “last five years” (i.e. the imaginary five years between where you really are and where you’re imagining yourself to be), and identify some of the milestones you accomplished to reach that level.

By seeing your future career as if you’ve already arrived, your brain will get super-creative and identify what had to happen to get you to that point. This imaginary game of “connect the dots” helps you identify the short-term goals you need to set in order to get to your long-term goal (i.e. your career in five years).

Identify the three most important short-term goals that work together to get you to your long-term goal, and write them down.

**Short-term Goal #1:**

________________________________________

**Short-term Goal #2:**
TIP: Need a quick creativity boost? Dude! You need a shower.

If your creative juices just don’t seem to be flowing, a shower might help. (Seriously!) I’ve heard and read different explanations for this phenomenon (everything from a chemical being released in your brain to the white noise created by the water), but whatever the scientific basis, taking a shower does seem to stimulate creative thinking for many people (including me).

I cannot tell you how many times I’ve been trying to figure out some technical issue, or trying to think of a creative way of explaining a certain concept to my students, when the answer comes to me in the shower. As strange as it sounds, if you’re in a creative slump, give it a try!

Step 3: Make a Plan

Using our packet routing metaphor, our first short-term goal becomes our “next-hop” address. After we get there, our second short-range goal becomes our new next-hop address. We then achieve our third short-range goal, and finally we’ve achieved our long-term career goal.

For now, since you’ve taken the time to identify your long-range goal and three short-range goals, let’s focus on that first short-term goal and make a detailed plan to achieve it. As you’re making your plan, ask yourself the following questions:

- **What do I need to learn to reach this goal?**
  If you don’t already possess the skills or knowledge necessary to attain your goal, you obviously need to get those skills or knowledge. This might involve reading a book, attending a class, doing some research on-line, or experimenting on actual gear.

- **What resources do I need to reach this goal?**
  Identify what hardware, software, and training materials you’ll need as you work towards your goal.

- **What people do I need to work with to reach this goal?**
  Are their experts (or at least, people that know more than you do about your topic) that you need to consult with? Do you personally know any of these people? How can you offer value to them as an incentive for them to help you?

- **Are the goals accomplishment goals or activity goals?**
  An accomplishment goal is met when you successfully meet a particular challenge, such as earning your CCNA certification. An activity goal is met when you perform a specific activity, such as reading a CCNA study guide five days a week for 2 hours each day.

- **What is the first step to reach your first short-term goal?**
Just like we took our big long-term goal and broke it down into smaller and more manageable goals, we can take each of our short-range goals and break them into specific steps. Of immediate concern is what we do first.

- **What is the timeline for the achievement of your short-term goals?**

  One of the biggest enemies we have in our battle to attain our goal is the evil specter of *drifting*. By “drifting” I mean getting caught up in the flow of life, reacting to other people’s priorities, and not giving yourself the gift of concentrated effort. To help avoid this drift, set a specific date by which you will have achieved each of your short-term goals.

**TIP: Create a mind map.**

As you can see, the creation of a plan can involve many moving parts, and it’s easy to overlook or forget to include something. Something that I’ve personally found valuable when planning out a large project is to create a *mind map* for that project. A mind map is a way to visually organize the various components making up a project, and while many mind mappers have strong opinions about the structure of these maps (e.g. arguing that you should insert pictures and vary the fonts and shapes), let’s get you started with the basics.

You can start your mind map by drawing a box in the middle of a page, and writing your long-term goal in that box, as seen in Figure 1-1. You could do this with pen and paper or one of many mind mapping applications on the market today. I use an application called [MindNode](#) that runs on Mac OS X.

![Figure 1-1 Putting your Long-Term Goal on Your Mind Map](image)

Next, draw a line for each of your short-term goals radiating out from the long-term goal, as illustrated in Figure 1-2.
Finally, as depicted in Figure 1-3, you can draw lines extending out from each short-term goal to represent the resources, people, and tasks related to that short term goal.

**Step 4: Take action**

At this point in your goal setting process, you’ve identified one major long-term goal, three complementary short-term goals, a plan for achieving your first short-term goal, and a timeline for achieving your goals. The missing ingredient is action, overcoming your inertia and actually doing something.

Do you remember *Newton’s First Law of Motion*? Even though Sir Isaac’s specific wording was different, the gist of it is, “A body in motion tends to stay in motion. A body at rest tends to stay at rest.” So, taking your first step is super important, because it not only breaks the inertia holding you back, it also creates the momentum that can lead to your next step, and then the next, and so on.
CASE STUDY: Goal Setting

To illustrate the goal setting process, let’s work through the following case study.

You’ve been working in the IT industry for a couple of years, and after attending a Cisco Live! conference you’re inspired to become a Cisco Certified Internetwork Expert in the area of Route and Switch (CCIE R/S). You decide to use the simple four-step process presented in this book to help you achieve your goal.

Step 1: Dream

To make sure you’re really committed, you find a quiet room in your home and sink into a comfortable chair. After closing your eyes, you take a few deep breaths and are feeling very relaxed.

Let’s further imagine that you’re currently 27 years old. So, you imagine where you want your career to be at age 32. You think about having a senior IT position, where you are primarily responsible for network design in your organization (or maybe a different organization). With your eyes still closed, you can feel the pride of your CCIE R/S certification, as you visualize the plaque on your wall.

You think of the financial rewards you’ll receive from being in the one percent of network professionals in the world who hold the CCIE designation. You realize in the back of your mind that reaching this high echelon will require extreme focus, effort, and determination. However, this vision of the future feels right to you.

Then it happens. You commit, and write down the following long-term goal:

“I will earn my CCIE in the area of Route/ Switch within a five year period, beginning today.”

Step 2: Future Pace

The task of going from where you are now (i.e. being in the IT industry for two years) to your goal of being a CCIE R/S in five years is certainly achievable, but you need a plan. So, you take your major long-term goal and break it down into three (or more) short-term goals.

- Short-term Goal #1: Earn my CCNA certification.
- Short-term Goal #2: Earn my CCNP certification.
- Short-term Goal #3: Prepare to take the CCIE R/S lab.

Note that the third short-term goal could be further broken down into sub-goals, such as:

(1) Pass the CCIE R/S Written exam.
(2) Construct a home lab.
(3) Spend 600 hours working through sample labs.
(4) Attend a CCIE R/S boot camp.

Your lofty goal of becoming a CCIE suddenly seems more real as you look at your list of short-term goals and sub-goals. So, you move onto Step 3, creating your plan.

Step 3: Make a Plan
You begin the creation of your plan by answering the questions previously presented:

- **What do I need to learn to reach this goal?**
  - Network fundamentals
  - Routing protocols
  - Cisco Catalyst switch features
  - Troubleshooting skills
  - Miscellaneous items on the CCIE R/S blueprint

- **What resources do I have to have to reach this goal?**
  - Cisco Press books and videos
  - Routers (for home lab)
  - Switches (for home lab)
  - GNS3 software (to emulate additional routers for home lab)
  - Practice lab scenarios

- **What people do I need to work with to reach this goal?**
  - My manager (to have dedicated study/practice time)
  - CCIE trainers
  - Other CCIE candidates (e.g. members of your study group)

- **Are the goals accomplishment goals or activity goals?**
  - **Long-Range Goal:** “I will earn my CCIE in the area of Route/Switch within a five year period, beginning today.” **ACCOMPLISHMENT GOAL**
  - **Short-term Goal #1:** Earn my CCNA certification. **ACCOMPLISHMENT GOAL**
  - **Short-term Goal #2:** Earn my CCNP certification. **ACCOMPLISHMENT GOAL**
  - **Short-term Goal #3:** Prepare to take the CCIE R/S lab. **(SEE SUB-GOALS)**
    - **Sub-Goal (1):** Pass the CCIE R/S Written exam. **ACCOMPLISHMENT GOAL**
    - **Sub-Goal (2):** Construct a home lab. **ACTIVITY GOAL**
    - **Sub-Goal (3):** Spend 600 hours working through sample labs. **ACTIVITY GOAL**
    - **Sub-Goal (4):** Attend a CCIE R/S boot camp. **ACTIVITY GOAL**

- **What is the first step to reach the first short-term goal?**
  
  *Buy the [CCNA Complete Video Course](#) and commit to watching the videos two hours per day for five days a week.*

- **What is the timeline for the achievement of your short-term goals?**
  - **Short-term Goal #1:** Earn my CCNA certification. **9 Months**
  - **Short-term Goal #2:** Earn my CCNP certification. **2 Years**
  - **Short-term Goal #3:** Prepare to take the CCIE R/S lab. **(SEE SUB-GOALS)**
    - **Sub-Goal (1):** Pass the CCIE R/S Written exam. **2 ½ Years**
    - **Sub-Goal (2):** Construct a home lab. **3 Years**
**Sub-Goal (3):** Spend 600 hours working through sample labs. 3 ½ **Years**

**Sub-Goal (4):** Attend a CCIE R/S boot camp. 4 **Years**

With this schedule, you could take your make your first attempt at the CCIE R/S lab after four years. While you certainly hope to pass on the first attempt, statistically, it takes about three attempts for most candidates to pass. However, even if it took you three attempts, your first attempt could be 4 years from your starting date. Your second attempt might be 4 ½ years out. Your third attempt would be five years from the time you began your journey, right on schedule.

To help you organize the various tasks, people, and resources needed to carry out your plan you create a mind map, as shown in Figure 1-4.

![Figure 1-4 Your CCIE R/S Mind Map](image)

**Step 4: Take action**

*It’s time to overcome your inertia and make that first step. So, you go to ciscopress.com and purchase my [CCNA Complete Video Course](https://www.ciscopress.com).*

**TIP: Diversify.**

Since this book focuses on your success as a Cisco networking professional, this goal setting chapter is focused on setting a career-specific goal. However, you should continue your goal setting process beyond the scope of your career, so that you have not just a successful career but also a successful and happy life. Personally, I set goals in categories such as physical, financial, spiritual, relationships, and career.
A Tale from the Trenches
In each chapter of this book, I’ll be sharing a personal story to reinforce the lessons presented in that chapter. Here, in Chapter 1, we’ve been discussing goal setting. This prompted me to dig out some of my old goal setting journals to see what my goals were years ago. Here are a few examples of what I found:


Do I believe any of these would have happened without setting specific goals for their attainment? Absolutely not. Having these goals in place caused me to make specific choices and take specific actions that would not have happened without these goals.
Chapter 2: When Life Gets in the Way

Your goals are set, and you’re cruising down that metaphorical road to success when all of a sudden you notice a detour sign, because the road ahead is closed. That’s what seems to happen all too often in our careers. Things are going well, and then some life event happens forcing us to take a detour from our intended path.

Staying with our metaphor of driving down the road of success, let’s imagine that your car has a navigation system. When you veer off your planned route, the navigation system dutifully recomputes your route and tells you how you can still get to your destination, even from the back road you now find yourself on. (As a hopefully interesting side note, navigation systems in cars use the Dijkstra algorithm to find an optimal path between two points. That is the same algorithm used by the Open Shortest Path First (OSPF) routing protocol). So it is with our careers. Even if we get thrown off course, there’s still a way to get from where we are to our ultimate goal.

Life’s Inevitable Detours: A Few Examples
Some of life’s detours that throw us off course are simply distractions. Maybe we start prioritizing something else over our current career goal. (This sometimes happens to me when a new Star Wars® book is released.) Perhaps we should refuse to take some of these detours and simply plow ahead in pursuit of our goal.

Other detours, however, need to be taken. As a few examples, consider the following:

- Illness
- Family responsibilities
- Work demands
- Urgencies (e.g. Your car breaks down.)

Is there a way for us to still make progress (albeit slower) to our goal when we find ourselves in the midst of such circumstances? I posit there is. Let’s examine each of the previous examples and see if there is a way to minimize the impact of such events on our career goals.

- **Illness:** If you get sick, or a family member gets sick, you clearly need to address that situation. Get yourself well, or give your loved one the help they need during this time. If it’s you that’s sick, you’re likely to be in a bed or chair a good bit of the time. Perhaps you could leverage some
of that time to read some white papers from Cisco’s website, or maybe a good Cisco Press book. Lying in bed can also be a good opportunity to watch training videos.

If it’s someone else who is sick, and you’re taking care of them, there might be a lot of down time (e.g. in a hospital waiting room). This situation is yet another opportunity to read some good study material. You don’t even need to take a book with you. With today’s smartphones, you can have eBooks and .PDFs stored on your phone for quick and easy access.

- **Family Responsibilities:** Similar to how you can maximize your “down time” during illness, you can also have your smartphone at the ready when attending family gatherings, dance recitals, and ballgames, just in case you find yourself with a few extra minutes.

  My habit of looking for small opportunities to sneak in a little extra studying whenever I can goes way back to the mid 1980s, when I bought my very first book on success and personal development. It was *The Official Guide to Success*, by Tom Hopkins. Reading that book ingrained in me Mr. Hopkins’ mantra that at every moment we should be doing the most productive thing possible.

- **Work Demands:** Depending on your current job, you might be able to get assigned to (or volunteer for) projects that compliment your current studies. For example, if you’re working on passing the CCNP SWITCH exam, look for opportunities at your job to do Cisco Catalyst switch configuration.

- **Urgencies:** Some events require your immediate attention, and there is simply not a good way to integrate your career pursuit into your dealing with those events. The strategy here is to minimize such events.

  While Chapter 4, *Time Alchemy*, deals specifically with time management, our current discussion reminds me of one of my favorite time management books. It’s *First Things First*, by the late Stephen Covey. In that book, Dr. Covey talks about how our activities fall into one of four quadrants: (1) Urgent and Important, (2) Non-urgent and Important, (3) Urgent and Non-important, and (4) Non-urgent and Non-important. The goal is to spend more of our time in the second quadrant (i.e. doing non-urgent yet important activities). By spending more time in the second quadrant, we’ll spend less time in the first quadrant (i.e. doing urgent and important activities). To make this concept of quadrants more relative to us as Cisco networking professionals, let’s consider a couple of activities and classify those activities into quadrants.

  The first activity is responding to a report that a WAN router is experiencing dropping a high percentage of packets due to the relatively limited WAN bandwidth being oversubscribed. To resolve the issue, you might have had to contact your service provider and had them provision additional bandwidth. Alternately, you might have configured your routing protocol to load balance across two WAN links.

  Into which quadrant would you categorize this activity (i.e. the activity of responding to a WAN router dropping a high percentage of packets)? Consider that users were currently experiencing poor network performance, and that needed to be addressed immediately. Let’s also assume that communication across the WAN link was important to the business (as evidenced by the high
traffic volume on the WAN link). I suggest that such an activity would fall squarely in the middle of the first quadrant (i.e. an urgent and important activity).

The second activity is configuring network monitoring software to send e-mail alerts when thresholds for various parameters are exceeded. For example, the software might fire off an e-mail to a network engineer if the temperature of a router exceeded 85 degrees Fahrenheit. Another threshold might be triggered with the average bandwidth utilization on a WAN link exceeded 70 percent.

How would you categorize this activity? Unlike responding to an issue that is currently impacting network performance, this activity is not urgent. However, it is important, because this activity could alert appropriate personnel of impending network issues before they actually occur, hopefully allowing network engineers to resolve the situation before any sort of outage happened. Would you agree with me that this would therefore be an activity found in the second quadrant (i.e. non-urgent but important)?

Considering these two activities together, notice, had more time been spent in the second quadrant, less time would have needed to be spent in the first quadrant. Specifically, if a network engineer had taken the time to setup monitoring software to generate an alert when WAN bandwidth utilization exceeded a certain threshold, they could have provisioned additional bandwidth before the link became saturated. As a result, they could have avoided the activity (in the first quadrant) of responding to the issue of packet drops.

What’s the lesson to take from this? Spend more time setting up systems and processes (e.g. configuring network backups and installing monitoring software), to reduce the number of urgencies to which you need to respond.

**A Tale from the Trenches**

I’ve already shared with you the genesis of my philosophy of doing the most important thing at every moment. So, allow me to share with you some specific examples.

The biggest impact illness has had on my career was back in the year 2000. I was a network designer for Walt Disney World in Florida. My mother, who lived in Kentucky, became very ill. She was diagnosed with myasthenia gravis, a neuromuscular disorder. My wife, daughters, and I made multiple trips back and forth between Florida and Kentucky to be with her while she was in the hospital. However, being a fairly new employee with Disney, I had very little sick time/vacation time available to me, and I quickly burnt through the limited amount I had. It got to the point where I had to start taking days off without pay.

Eventually, I made the huge career decision to leave Disney, the largest single-site employer in North America, whose network contained over 500 Cisco routers and thousands of Cisco switches. Being an only child, my responsibility was to care for my mother. By the way, as I write this over twelve years later, she is doing well and living independently.

This event, however, was a major career reboot for me. While working at Disney, I was preparing for my CCIE R/S lab (having already passed the written exam). My lab date was scheduled, and Disney had already paid my airfare to the lab in RTP North Carolina.
After making the decision to return to Kentucky, I had to get a job, any job. A DSL service provider had just opened an office in Lexington, KY (about a 40 minute commute from where I was going to be living, not bad). Fortunately, I was able to get a job there as a regional manager for the systems engineers in the area. While learning the ropes at this new job, I kept up my CCIE studies, and looked for a job that better suited my interest in Cisco technologies.

Based on my experience with Cisco Catalyst 6500 Series switches at Disney, I was offered a position as an instructor with a Cisco Learning Partner (CLP). This allowed me to focus all of my working hours on learning more and more about Cisco technologies, which played a pivotal role in getting me better prepared for the CCIE R/S lab (which I eventually passed, on my third attempt, in August of 2001).

The two main lessons I hope to impart from this personal story are:

- While your career will almost certainly reroute you on the occasional detour, find small chunks of time where you can continue to take steps (no matter how small) toward your goals.
- Try to find employment where your day-to-day job directly complements your long-term career goals. If you have to settle on a job, just to pay the bills, don’t let the familiarity of that job prevent you from looking for that perfect job for you, which most certainly does exist.
Chapter 3: The Curiosity Key

Walt Disney is one of my personal heroes, and the following quote from him beautifully sets the stage for this chapter’s topic, curiosity:

We keep moving forward, opening new doors, and doing new things, because we're curious, and curiosity keeps leading us down new paths.

- Walt Disney

Curiosity about how something works spurs on mastery of that topic. It motivates us to want to learn more. This chapter examines some of the benefits of having a healthy curiosity, steps to further develop your curiosity, and another tale from the trenches that illustrates how curiosity led to the development of one of my most popular Cisco training videos.

The Benefits of Curiosity
Albert Einstein said, “The important thing is not to stop questioning. Curiosity has its own reason for existing.” Are you curious how curiosity can help us in our Cisco careers? Let’s consider just a few benefits of curiosity.

- **Motivation**: Becoming more knowledgeable in your field and advancing in your career takes effort. It’s all too easy for us to not push ourselves on to the next level, but curiosity can help give us the sorely needed motivation.

- **Learning**: Personal confession time… When I was a student at the University of Kentucky, getting my Bachelor of Science in Electrical Engineering degree, I wasn’t as curious as I should have been. Engineering classes tend to be very mathematical. A significant percentage of class time was spent by the professors working out mathematical proofs, showing that particular equations (e.g. Maxwell’s equations, describing electromagnetic field theory) were indeed correct. My perspective was, “I trust you! Just give me the formula, without proving it, and let me use it to figure out a problem.” Looking back, I realize that I could have learned the material at a much deeper level had I been curious about those seemingly boring proofs.

  Fortunately, my attitude changed when I dove into learning about computer networking. I remember reading about TCP/IP many years ago, and I was so fascinated about the inner-workings of the protocol suite that I got a notebook and started documenting what I was learning (e.g. the different fields in the TCP header). My curiosity helped me learn better and made me want to learn.

- **Troubleshooting**: One of the most common tasks of network engineers is that of troubleshooting network issues. Troubleshooting can be emotionally charged, with end users frustrated about the issue they’re experiencing and with network engineers sometimes frantically trying to resolve the issue. However, if the troubleshooter approaches the issue with curiosity, they can often resolve
the issue much quicker than haphazardly trying one thing, and then another, and then another until the issue is finally resolved. Specifically, curiosity leads us to question things, even things that might appear obvious. This questioning often uncovers the underlying issue that needs fixing.

How to Cultivate your Curiosity
At this point, you are hopefully sold on the concept of curiosity being a very positive characteristic to have as a Cisco professional. This then leads to the question of how we cultivate a stronger curiosity within ourselves. Here are a few tips:

- **Study**: Earlier I stated that having curiosity helps us learn. Now allow me to suggest that the corollary is also true. By studying and learning more about a topic, you tend to develop a deeper curiosity about that topic. For example, consider two network engineers. They have the same amount of experience, but the first engineer studies Cisco technologies on their own time, while the second engineer just learns on the job. Let’s further assume that they are each assigned to troubleshooting a Spanning Tree Protocol (STP) issue in their network. Who do you think will ask the more effective troubleshooting questions?

  The engineer who had been studying on their own time might look at the issue and be curious about which switch in the topology is acting as the root bridge and about the bridge priority of that switch.

  The engineer who had not done as much independent study, might ask less effective questions. While they might be curious as to why the network wasn’t working correctly, their level of curiosity is constrained by their lack of understanding about the operation of STP.

  The conclusion that we can draw is that the more we know about a technology, the more curious we become.

- **Teach**: When you teach a course, or a single concept, to someone else, that act of preparing to teach creates curiosity about your subject matter. If there are any lingering questions you have about a topic, you’re more curious about those questions, since your students might have those questions too. For example, you might think, “What if a student asks this? How would I answer it?”

  Being a traditional teacher, standing up in front of a class, is not in everyone’s DNA. However, there are other ways to teach what you know. You can teach somebody one-on-one. You could write a technical white paper, or record a video tutorial. Whatever way best suits you, I encourage you to teach.

- **Try something new**: Stepping outside our wheelhouse and into the realm of uncertainty stimulates our curiosity. After all, there are so many unknowns to be curious about. For example, if you’re primarily focused on Cisco Unified Communications implementations, you might volunteer to help with a very different technology, such as a security project (e.g. installing a Cisco Adaptive Security Appliance (ASA)).
• **Create a test bed:** The term *test bed* is often used to refer to an isolated collection of equipment on which you can perform experiments without impacting a production network. Having such a set of experimental equipment at your disposal allows you to play what I call “what if games.” If you’re curious as to what would happen in a production network if you performed a certain configuration, you could safely try it out in your test bed.

For example, you might curiously ask yourself, “What convergence time would I get if I reconfigured the Hot Standby Router Protocol (HSRP) Hello timer on my routers.” If you had a test bed environment, you could duplicate a portion of your production network and quickly determine the convergence time. This could then lead to the next question, and the next, and so on.

**A Tale from the Trenches**

While studying for my second attempt at the CCIE Voice lab, one of the technologies on the lab blueprint that I (and many other lab candidates) found most challenging was quality of service (QoS) configuration on Cisco Catalyst 3750 Series switches.

After reading through the Cisco docs, whitepapers from CCIE training companies, and doing practice labs, I still didn’t completely get it. For example, the way Shared Round Robin and Shaped Round Robin worked was very confusing and unlike any other Cisco technology I’d ever seen.

I’d been creating training videos for my website ([1ExamAMonth.com](http://1ExamAMonth.com)) for some time, and I decided that what the industry needed was a comprehensive training video on Cisco Catalyst 3560 and 3750 QoS. Not only would creating such a video fill a need in the training space, it would force me to learn the technology such that I could explain it to others.

So, I got incredibly curious about all aspects of QoS on these switches. I would dissect the Cisco documentation and rewrite what I was learning, in my own words. The result was a 1 hour and 45 minute video entitled *Cisco Catalyst 3560 and 3750 QoS Simplified... Seriously!* This video has since become one of the most popular videos on my [YouTube channel](https://www.youtube.com) and has helped many CCIE R/S and CCIE Voice candidates get a better handle on this challenging topic.
Chapter 4: Time Alchemy

While having lofty goals is key to propelling your career into the stratosphere, if you don’t have time to take action on your goals, what good are they? I shouldn’t say that you don’t have time. After all, we all have the same amount of time during a day. Unfortunately, our days can become filled with distraction (e.g. Facebook®, television, and those people in your life that are “time vampires”).

Life... is a timed test. No pressure.
- Kevin Wallace

This quote came to me after having a conversation with one of my daughters about a timed test she had at school. She had a limited amount of time to answer a certain number of questions, and it occurred to me that life is the same way. We’re here on earth for a limited time, and we’re presented with questions to answer and problems to solve while we’re here. As I dwelt on that thought, it created in me a sense of urgency to be a good steward of my time. That’s the focus of this chapter.

You’ll notice that this chapter is entitled Time Alchemy. Alchemists of old would try to create gold from lead. While they were unsuccessful, we can be time alchemists, creating “gold” (i.e. something valuable) from our time.

If you want to dive into a very systematized and strategic time management plan, you should be aware of two of the more popular approaches to time management:

1. Stephen Covey’s 7 Habits Process
   Supporting Books:
   - The 7 Habits of Highly Effective People
   - First Things First

2. David Allen’s Getting Things Done Process
   Supporting Books:
   - Getting This Done: The Art of Stress-Free Productivity
   - Ready for Anything: 52 Productivity Principles for Getting Things Done
This chapter provides an overview of these two very popular approaches. However, if embracing a study on time management is a bit much for you at this point, I’ll also give you some very basic time management strategies to get you started towards a more productive way of life.

**Overview of the 7 Habits Approach**

Time management using the *7 Habits* approach uses the following six-step process:

**Step #1 - Connect to your mission**: This step involves you thinking about your main purpose in life. All decisions you make should be congruent with this mission.

**Step #2 – Review your roles**: Think about the different roles you play in life. For example, I have the following roles: parent, husband, son, instructor, author, entrepreneur, and Christ-follower.

**Step #3 – Identify your goals**: In this step, you define a goal for each of your roles.

**Step #4 – Organize every week**: Prioritize your activities on a weekly basis, with an emphasis on performing more important tasks first.

**Step #5 – Demonstrate integrity when faced with a choice**: When the inevitable distractions occur in your life, make sure your actions are driven by your true priorities, rather than what seems urgent or easy to do in the moment.

**Step #6 – Evaluate the previous week**: Determine what lessons can be gleaned from last week when planning for the upcoming week.

**Overview of the Getting Things Done Approach**

Time management using the *Getting Things Done (GTD)* approach uses the following five-step process:

**Step #1 – Collect your commitments**: Capture all of the commitments you make. This capturing could be done on paper or using one of many GTD software applications available on the market today.

**Step #2 – Process your commitments**: Determine what you’re going to do with each of the commitments you captured in the previous step.

**Step #3 – Organize your commitments**: Group your commitments into *context* lists. For example, one context might be *the office*. Another context might be *phone calls*. Yet another context might be *home*. Tasks that you need to perform in your office would therefore be grouped together. Similarly, all tasks involving phone calls you need to make would be grouped together, and tasks you need to perform while at home would be grouped together.

**Step #4 – Review your commitments**: Review your commitments at different intervals (e.g. daily and weekly). As part of this review, identify where you need to place your priorities.

**Step #5 – Carry out your commitments**: This step involves the actual doing a task to which you’ve committed. This is with the assumption that the task you’re doing is what you consider to be the most important task you could be doing right now.
Basic Time Management Strategies
If you’re not yet at the point of getting into a highly structured time management system, you can at least get started with a few simple actions. Once you see results from these simple processes, who knows, you might be motivated to dig into the 7 Habits or GTD processes.

Step #1 - Identify the six most important tasks for you to do each day: At the beginning of each day, or the night before, write down what you consider to be that day’s six highest priority tasks. You could do this on paper or using software. (Personally, I use Evernote for my to do list. Evernote allows you to manage a collection of notes and notebooks on PCs, Macs, and various mobile devices.) As you complete each task, check it off of your list. Tasks that don’t get done today can be carried over to tomorrow’s list.

Step #2 – Give yourself the gift of 20 minutes: We often hesitate to begin a task, because we know it will take a relatively long time to complete. Instead of putting off the task (and mentally burdening yourself with the knowledge that it still has to get done), make an agreement with yourself that you’ll put total focus into that task for the next 20 minutes. During this 20 minute period, you won’t answer e-mails or take phone calls. This is a time of total focus, with the knowledge that you’ll get a break of five to ten minutes afterwards. Making the small time commitment of 20 minutes not only results in progress toward the task’s completion, it creates momentum, motivating you to dedicate another block of 20 minutes to the task, and so on, until the task is complete.

Step #3 – Put yourself first: As we begin our workday, many of us check our e-mails. Author and speaker Brendon Burchard says it best, “Your e-mail inbox is nothing more than a conveniently organized list of other people’s priorities.” While this is the most difficult of these three basics steps to do (at least it is for me), I encourage you to not respond to e-mails for at least one hour (or longer if you can stand it). During that first hour of your day, spend time making progress on your priorities. (This assumes that you’re not in some sort of a customer service role where one of your priorities is to respond to customer e-mails.)

Do yourself a huge favor, and try out these three very basic strategies for time management for the next week. I think you’ll be astonished.

A Tale from the Trenches
Let me wrap up this discussion on time management by sharing some personal insights into how I use time management in my career. A recent example is from when I was preparing for the CCIE Voice lab.

My lab date was March 28, 2012. In the weeks leading up to the exam, I would take vacation days and use weekends to go through full eight-hour mock lab scenarios. I had fully documented several mock lab scenarios that I repeatedly practiced. As seen in Figure 4-1, I scheduled mock lab days on my Microsoft Outlook® calendar. If I had not scheduled this time, it’s very possible that I would have been caught up in the current of life and lost some of this super valuable practice time that led to my successfully passing the lab.
For me, time management is more than just a way to get things done. I want the things I do to be in line with my values, my purpose, and my mission. Have you ever taken the time to document your values, purpose, and mission? Let’s consider each of these.

- **Values**: Make a list of things and personal traits that you value most and that you want to be reflected in your life on a daily basis. My personal values are as follows:
  - Honesty
  - Family
  - Growth
  - Prayer
  - Financial stewardship
  - Knowledge

- **Purpose**: Identify what it is you were put on this earth to do. This is often a hard question to answer. For me, it’s taken lots of thought and has been refined many times over the years. However, at this point in my life, I define my purpose as follows:
  - My purpose is to honor God, provide for my family, and serve others by using my spiritual gift of teaching.

- **Mission**: Your mission defines how you will live out your purpose, and it should be congruent with your values. To give you another personal example, my mission statement is as follows:
  - I make the world a better place by sharing my message with others. I grow my business prayerfully and with integrity. By being a good steward of my blessings, I honor God and support the dreams of my family.

I keep my values, purpose, and mission in Evernote, where I can review them frequently.
Before continuing to the next chapter, please take the time to decide how you are going to manage your time over the next week. Do you already have a time management discipline in place? Are you going to learn more about the 7 Habits approach? What about the GTD method? Or, will you try the three simple strategies I shared with you.

Also, make sure you’ve completed at least a first draft of your values, purpose, and mission. I recommend keeping them somewhere that will let you view them frequently.
Chapter 5: Tomes of Wisdom

In high school, I really, really disliked reading. My reading speed was slow, and I found most of the assigned books were boring to me. Since this was back in the 1980s, before audio books really took off, I got my mother to read the books into a cassette recorder. That allowed me to listen to the books without going through what I considered to be the agony of reading.

A few years later, I discovered that my distain for reading was based on the specific books assigned in high school. I actually loved reading about things that interested me. In fact today, reading is what I mainly enjoy doing in my free time.

At some point during the 1990s, my local Cisco sales rep gave me my first Cisco Press book. I was hooked, and started to assemble a Cisco Press library. Little did I suspect that one day my name would be on several Cisco Press titles.

My favorite quote about books comes from the late Jim Rohn, who was a personal development speaker.

*Poor people have big TVs. Rich people have big libraries.*

- Jim Rohn

A book can be a powerful tool in our career. It represents the knowledge and wisdom the author gained over years of experience, and consolidated into something you can hold in your hands.

In the Cisco arena, I consider having a technical library a necessity. This library might consist of traditional bound books, eBooks, or a combination of both. I’ve got to admit, while there’s something visceral about holding a bound book in my hands, being able to carry around dozens of books on my Apple iPad® is incredibly convenient.

In addition to books, Cisco also has a vast technical documentation section available on their website. In fact, CCIE candidates have access to that portion of Cisco’s website while taking their lab. My guess is that the lab designers want to not only test a candidate’s technical knowledge, but also their ability to quickly find information in the documentation.

In this chapter, we’ll begin by taking a look at different categories of Cisco Press books you’ll be choosing from when building your technical library. Then, we’ll see how to find information in Cisco’s on-line documentation.

**Categories of Cisco Press Books**

In general, Cisco Press products fall under one of four product families:

1. **Certification Self-Study Product Family**: This product family targets learners who are independently preparing for Cisco exams. Products include such study aids as books, videos,
flash cards, and network simulators (allowing a learner to get a virtual hands-on experience). The specific product lines in this family include:

- Foundation Learning Guides
- Network Simulators
- Portable Command Guides
- Certification Guides
- CertKits
- Video Mentors
- Quick References
- CertFlash Cards Online
- CCIE Professional Development Series

2. **Network Technology Product Family**: This product family focuses on the basic operation and theory of networking technologies, along with their real-world applications. The specific product lines in this family include:

- First-Step Series
- Fundamentals
- Networking Technology Guides

3. **Network Business Series**: This series of books targets both business and networking professionals. The content tends to be less technical than that found in other product families, and instead strives to convey business implications associated with emerging networking technologies.

4. **Cisco Networking Academy Product Family**: This product family is the result of a collaborative effort between Cisco Press and Cisco Systems to produce curriculum for Cisco’s Networking Academy. The specific product lines in this family include:

- Course Booklets
- Companion Guides
- Labs and Study Guides

When you’re trying to find the next addition to your Cisco Press library, you can go to their homepage (http://ciscopress.com), and click on the SERIES link, as show in Figure 5-1. From there you can navigate into one of the previously mentioned product lines.

![Figure 5-1 Navigating to Cisco Press’ SERIES Page](image-url)
Using Cisco’s On-Line Documentation

In the real-world, and in the CCIE Lab, being able to efficiently navigate Cisco’s on-line documentation is an incredibly valuable skill. (Please note that Cisco periodically updates their website. So, the following screenshots might not reflect exactly what you’ll see when searching for documentation.) To access the on-line documentation, let’s begin at Cisco’s homepage (http://cisco.com), and click Support as seen in Figure 5-2.

![Cisco System’s Home Page](image)

Next, scroll to the bottom of the Support page, and click Configure, as seen in Figure 5-3.
You’ve now arrived at the home base for on-line Cisco documentation, as illustrated in Figure 5-4. For future use, you might want to bookmark the link to this page:

http://www.cisco.com/cisco/web/psa/configure.html
Figure 5-4 Cisco System’s On-Line Documentation Page

This is the previously mentioned page that you have access to while taking a CCIE lab. Whether or not a CCIE lab is in your future, you can certainly benefit from spending some time on this page. Practice is required to become proficient in the use of this page, and you’ll tend to gravitate towards the submenus specific to the technologies you primarily work with.

When preparing for my CCIE Voice lab, I would practice my speed in finding specific information (e.g. a long and hard to memorize URL) in the docs. Let’s illustrate the use of this hierarchical documentation system through an example.

Let’s say we wanted to find the document that tells us how to put a background image on a Cisco 7965G IP Phone. We begin with the logic that an IP phone is a product that would fall under the broad category of Voice and Unified Communications. Among the various Voice and Unified Communications categories, an IP phone would be categorized as an IP Telephony product. So, we select Products in the left-most pane, as seen in Figure 5-5. Then, we select, Voice and Unified Communications, followed by IP Telephony.
Since an IP phone is an endpoint, *Unified Communications Endpoints* is selected next, as illustrated in Figure 5-6.

The Cisco 7965G IP Phone is obviously part of the *7900 Series*. So, we select that next, as we see in Figure 5-7.
At this point, our menu selections have been fairly straightforward. We might now have to rely on some trial and error. For example, we want to set the background image on a phone. Would that be under **Configure, Install and Upgrade**, or **Maintain and Operate**? To me, it doesn’t seem to be an obvious choice (hence the trial and error). With enough experimentation, you’ll discover that we need to navigate to select **Maintain and Operate**, as seen in Figure 5-8.
After selecting Maintain and Operate, you can next select Maintain and Operate Guides, as depicted in Figure 5-9. As a side note, it’s interesting that we’re told there are 197 documents under this selection.
We now find ourselves faced with those 197 documents, and we scroll down to the section containing guides for the Cisco 7965G IP Phone. Even after we’ve found the phone we’re looking for, we still need to select the appropriate guide, based on the version of Cisco Unified Communications Manager (CUCM) we’re using.

For our example, let’s assume we’re using CUCME 9.0. So, we select *Cisco Unified IP Phone 7975G, 7971G-GE, 7970G, 7965G, and 7945G Administration Guide for Cisco Unified Communications Manager 9.0 (SCCP and SIP)*, as illustrated in Figure 5-10.

**Figure 5-10 IP Phone Background Screen Configuration – Part 6**

From the list of available topics (on the left of the screen), *Cisco Unified IP Phone Customization*, as seen in Figure 5-11, seems like a logical choice for what we’re trying accomplish.
After selecting *Cisco Unified IP Phone Customization* we’re transported to that section of the document, where we’re presented with a list of contents for this section of the guide. From this list, we find *Custom Background Images*, as we notice in Figure 5-12. Sounds perfect!

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**Figure 5-11 IP Phone Background Screen Configuration – Part 7**

**Figure 5-12 IP Phone Background Screen Configuration – Part 8**
At long last, we’ve arrived at the instructions for configuring a custom background image, as shown in Figure 5-13.

**Custom Background Images**
You can customize your phone’s background image. There are three types of background images:
- **Background Image:** Appears on the home screen of the phone.
- **Background Image 1:** Appears on the first page of the software.
- **Background Image 2:** Appears on the second page of the software.

To configure a new background image, follow these steps:
1. Log in to the Cisco IP Phone.
2. Go to the **Settings** menu.
3. Select **Background Image**.
4. Choose **Custom Background Image**.
5. Select the new image using the navigation keys.
6. Click **Save**.

**List of File Format Requirements**
- **.jpg**
- **.png**
- **.gif**

**Example Files:**
- **CVOKE.png**
- **TSHOOT.png**

**Search Feature on Cisco’s Website**
Cisco has a comprehensive search feature. You can search for the specific instructions you need. For example, typing “Custom Background Images” in the search bar will return relevant results.

**A Tale from the Trenches**
Having written several titles for Cisco Press, I wanted to use this section to give you a book selection tip based on a little known fact. When selecting a Cisco Press book for certification self-study, it’s important to understand the distinction between a couple of Cisco Press product families.

Consider a couple of the Cisco Press books I’ve written, which are shown in Figure 5-14. The **CVOICE** book is a **Foundation Learning Guide**, while the **TSHOOT** book is an **Official Certification Guide**.

**Figure 5-13 IP Phone Background Screen Configuration – Part 9**

Wow! That was quite a journey from Cisco’s home page to the specific set of instructions we needed. This seeming complexity is a product of Cisco’s wide variety of products, which many would argue is a good thing. So, personally, even though several clicks of the mouse were required, I’m still a fan of this hierarchical documentation structure.

There is a **Search** feature on Cisco’s website, and many network professionals prefer to simply search for what they want. Admittedly, I do use the **Search** feature. However, navigating through the documentation is still my preferred way of finding just the right document to guide me through what I’m trying to do at the moment.
What many people don’t realize is that books in the *Foundation Learning Guide* product line are based on the material in the corresponding Cisco course, taught by Cisco Learning Partners (CLPs). In fact, an author is allowed to reuse as much of the original course material as they want. So, you’re likely to see many of the same descriptions, tables, and diagrams in a Foundation Learning Guide book as you would the actual course material. Some readers prefer this type of book, because they want the same content they would have received had they attended the actual course.

Conversely, books in the *Official Certification Guide* product line are solely written by the author. While the author does cover the topics in the exam blueprint, they are not quoting directly from a student guide. Some readers prefer this type of book, as opposed to a Foundation Learning Guide book, because they like the way a certain author explains a concept. In fact, many Cisco Press customers have a few favorite authors, and they’ll most likely prefer a book written (solely) by one of their literary heroes as opposed to an adaptation of a student guide.

I’ve written books in both categories and think both are valuable. The reason I even bother to bring up this distinction is I want you to choose the type of book that works best for you.
Chapter 6: Getting Your Hands Dirty

While documentation is indispensible in your mastery of Cisco technologies, at some point you have to “get your hands dirty.” In other words, you have to actually configure the routers, switches, and other devices about which you’re studying. For some people, this is a trivial task, because they work with Cisco gear in their day-to-day jobs. For others, who might be self-studying, getting their hands-on practice equipment could be a bit more challenging. In this chapter, we’ll consider a few options for getting you the hands-on experience that is vital to your career.

Using Equipment at Work
If you work with Cisco equipment on a routine basis as part of your employment, you are in a very fortunate situation. You have access to, potentially, very expensive equipment, which you didn’t have to buy.

There is an important distinction to be made here. Do you have access only to equipment currently in use, or do you have access to spare equipment, which you could use to create a practice lab? If you’re only able to access equipment currently in production, then your experimentation will be limited to tasks that won’t disrupt business operations.

However, if you have access to spare equipment, you might want to get permission to construct a lab topology from that spare equipment. With just three routers and a couple of switches, you can experiment with lots of Cisco IOS features (e.g. routing protocols, route summarization, route redistribution, STP, EtherChannel, VLAN Trunking Protocol (VTP), trunking, and many more).

Using Equipment from Work
Many learners need to do much of their study on their own time. If that describes you, see if your employer will loan you some equipment to help you build a practice lab topology in your home. This can be a win-win scenario. From your employer’s perspective, you’re getting training on your own time, and you’re becoming a more valuable employee.

From your perspective, you’re getting access to equipment you didn’t have to buy, and you get the flexibility of practicing on this equipment when it’s convenient for you. Maybe you have an hour to kill at home one Saturday morning before meeting up with some friends or family. You could easily fire up your routers and switches and practice that technology you’ve been studying.

Simulators
When practice routers and switches are not easily available from your employer, or when you need to create a more complex topology involving several devices, a network simulator might be the next best thing to real gear. Network simulators often allow you to drag-and-drop icons onto a topological diagram
to create a simulated network. You can then access the command line interface (CLI) of a specific device, and start issuing commands.

Wendell Odom’s CCNA 640-802 Network Simulator (2nd Edition) is one of the more popular network simulators out there today. As the name suggests, it targets CCNA candidates, and it contains over 300 practice labs.

**Emulators**

While simulators offer a cost-efficient way of practicing lots of configuration tasks, keep in mind that they are just simulating Cisco IOS. In other words, if you wanted to veer off the beaten path of the a prescribed lab activity and experiment with something on your own, the commands you attempt to enter might not be supported by the simulator.

Because of this limitation, many learners prefer to *emulate* a router rather than *simulate* a route. By emulation, we’re talking about running actual Cisco IOS software, but not on a router. Instead, a router emulator is an application that runs on a computer and has the ability to emulate router operations, including the executing of Cisco IOS code.

With an emulator, you might have a single computer (with plenty of RAM) emulating multiple routers. The beauty of this approach is that when you’re issuing commands at the CLI, you’re entering the commands into actual Cisco IOS, not a simulator.

Like network simulators, network emulators are not a perfect solution. For example, network emulators tend to do a good job emulating Cisco routers, but are usually lacking when it comes to emulating other devices (e.g. switches).

There’s also the concern of Cisco IOS software licensing. Please keep in mind that I am not an authority of the legalities surrounding the question of licensing. I am only giving you my understanding, which may or may not be accurate. However, it is my understanding that to legally install a Cisco IOS image on an emulator, you have to own a license for that software image. In a discussion with a Cisco engineer, I asked what Cisco’s view was concerning network emulators that ran Cisco IOS. He stated that he was personally running an emulator on his Cisco-owned laptop, and that he was unaware of any official stance Cisco had taken regarding network emulators.

The most popular network emulator is GNS3 (where GNS stands for Graphical Network Simulator). Yes, even though the word “simulator” is in the name, it really is doing emulation. GNS3 is freely available from [http://www.gns3.net/](http://www.gns3.net/). *(NOTE: Even though GNS3 is freely available, Cisco IOS is not. You need to provide your own.)*

Figure 6-1 shows a sample topology I created using GNS3. Notice that I was able to emulate a Frame Relay switch, in addition to three routers, all on one computer. The configuration and optimization of GNS3 is a study in itself. Fortunately, there are many excellent YouTube videos on the subject, should you want to learn more.
Renting vs. Buying

If your needs are advanced (e.g. if you’re preparing for a CCIE lab), most likely, neither simulators nor emulators will do all you need them to do, and you might not be able to build your topology using spare equipment from work. At that point, you have two main options:

1. Renting Rack Time
   A common approach many CCIE lab candidates use to get access to practice lab gear is renting remote access to a rack of equipment, previously cabled together into a given topology. This approach can be far less expensive than purchasing your own equipment, and you don’t have to spend your time getting the basic topology connected and configured. However, when you rent rack time, usually your blocks of time are in increments of a few hours (e.g. eight hours). So, if you’re working through a mock lab scenario, you might not finish during your reserved block of time. Then, in your next reserved block of time, you have to spend significant time getting everything configured to the point your last session ended. This downside can be somewhat mitigated by backing up your configurations at the end of one session, and restoring them at the beginning of the next session. However, you’re still consuming time doing the backing up and restoring.

2. Buying Your Own Gear
   Many CCIE lab candidates prefer to buy the equipment necessary to construct their own home lab. They point out such benefits as being able to work on their rack whenever they have a few minutes, without waiting for their next scheduled block of time.
Of course, when you buy your own gear, you do end up spending time constructing and configuring the basic topology. Some see this as a drawback, pointing out that they could better use that time practicing. An opposing view held by many is that it’s a good thing to construct your own home lab, because you learn more about the hardware. Unquestionably the biggest obstacle standing in the way of many CCIE lab candidates buying their own lab gear is the expense. However, the philosophy of many who buy their own equipment is that they’ll buy it, study with it, and then sell it. If they can sell the equipment for anywhere near the price they originally paid, then the net expense of buying your own gear is suddenly comparable to renting rack time.

A Tale from the Trenches

My first hands-on experience with Cisco gear was around 1989, on a Cisco AGS+ router running Cisco IOS 7.x. I was working at Eastern Kentucky University, and we were in the process of building a campus area network (CAN), interconnecting local area networks (LANs) within buildings with the Cisco AGS+ router. While this gave me a great introduction into Cisco router configuration, most of the routers and switches we purchased were quickly put into production. As a result, I was never able to construct a very elaborate lab environment.

Later, when working at Walt Disney World, I was thrilled to see that we had a dedicated lab facility, with racks and racks of equipment. This lab would be used to mock up design scenarios and troubleshoot issues within the confines of an isolated environment. The first example that comes to mind was an issue the Disney Cruise Lines (DCL) was experiencing. They had Cisco Catalyst 5500 Series switches onboard, and they were suffering from poor network performance. In the lab environment, we duplicated the issue, and here is what we concluded:

*The Route/Switch Module (RSM) in a Cisco Catalyst 5500 Series switch was logically connected to the switch ports via a 400 Mbps EtherChannel. This 400 Mbps path was becoming saturated during times of peak traffic. To resolve the situation, we enabled Multi-Layer Switching (MLS) on the switch. MLS allowed the first packet of a data flow to be routed (using the RSM). However, the results (e.g. ingress and egress ports used to route between specific source and destination IP addresses) were stored in memory (i.e. the MLS cache). Subsequent packets in the data flow could then be switched (with assistance from the MLS cache) without sending traffic over the EtherChannel to the RSM. That’s why this technology is often called “route once, switch many.”*

Later, after becoming a full-time instructor with a Cisco Learning Partner (CLP), I was preparing for my first CCIE. It was in Route/Switch. I had some equipment in my home, which was required for my job. However, it was not nearly enough to mimic the topology in the CCIE R/S lab. So, I used rack rentals during part of my practice time. This was back in 2001, when there was a Token Ring switch on the lab. So, rack rentals were a perfect solution for practicing the few Token Ring switching tasks I was responsible for in the lab.

I made my first lab attempt in January of 2001, and failed. It was shocking for me to see the difficulty of the lab. After receiving my disappointing score report, I realized that I needed to dip into my family savings and purchase some additional gear. Also, a friend with some spare equipment offered to loan me a couple of routers. Soon, I had a much improved rack of equipment.

There were a couple of gaping holes in my home lab. Specifically, I had no Token Ring switch, and I had no ISDN simulator. My intent was to use rack rental equipment to fill those two voids. My second
attempt, in June of 2001, still fell short of the passing mark. However, I was getting much closer to passing.

One of my weaknesses was ISDN. So, even though it was expensive, I decided to buy an ISDN simulator. That purchase turned out to be one of my best purchases ever. Over the next one and a half months, I got really good at ISDN configuration and was ready for whatever ISDN-related tasks the lab might throw at me.

My third lab attempt was in August of 2001, and it was a pass! I then returned the equipment that I had borrowed and sold what I had purchased. By the time I resold everything, my home lab cost me about $500.

Years later, when going after my second CCIE (in voice), my strategy was to rely on rack rentals, because there were so many pieces to a CCIE Voice lab (i.e. five servers, four Cisco ISR routers, one Cisco Catalyst 3750 Series switch, a Cisco Unity Express (CUE) module, two EtherSwitch modules, multiple Packet Voice DSP Modules (PVDMs), multiple T1/E1 and serial ports, and multiple Cisco IP Phones.) Before my first attempt, I attended a CCIE Voice boot camp, and my eyes were once again opened to how difficult a CCIE lab, of any kind, could be. Somewhere around day three of the boot camp, I realized that I needed to dip into the family savings again and build out my home lab. I remember very clearly talking to my wife on my cell phone while I walked around the parking lot of the boot camp. She was totally supportive, and over $7,000 later (along with about $5,000 worth of gear from my employer), I had a full blown CCIE Voice practice rack.

My boot camp instructor told us that we should have at least 600 hours of practice time in before attempting the lab. That’s almost exactly what I had when going for my first attempt at the CCIE Voice lab. Unfortunately, like my first attempt at the CCIE R/S lab, I wasn’t even close, and I knew it at the end of the day.

In preparation for my second attempt, I didn’t need any additional equipment. Instead I just needed to log many more hours on that equipment. Prior to my second attempt, I’d logged a total of about 1,600 hours of study. This time, my lab attempt was successful, and I became a dual CCIE on March 28, 2012.

I was able to sell most of the equipment purchased for my home lab. So, again, the cost of having my own equipment was negligible.
Chapter 7: A Certified Success

Having the appropriate Cisco initials after your name (e.g. CCNA, CCNP, or CCIE) is a shortcut way of letting someone know your relative skill level. Even if you’ve got the skills and are at the top of your game, you still might be passed over when you’re looking for a new job, because that new job explicitly requires a specific certification.

For many Cisco professionals (including me), earning certifications is less about impressing others and more about pushing yourself, to see how good you really are and what you’re capable of. I always get a rush when attaining a new certification and start thinking about what’s next.

Also, if you’re a consultant, having a nice collection of Cisco certifications is an instant way to establish credibility with potential clients. You could even use your hard-earned credentials in your marketing materials.

The Spectrum of Cisco Certifications

Hopefully, you’re convinced that earning certifications is a worthy goal for Cisco professionals. However, which certifications should you go after? First, let’s identify the different levels of certifications. (NOTE: Please keep in mind that Cisco regularly makes updates to their certification tracks. So, for the latest information, visit: http://www.cisco.com/web/learning/index.html)

**Entry Level:** Someone with an entry level certification is expected to be able to install, operate, and troubleshoot small networks. At the time of this writing, Cisco identifies two entry level certifications:

- Cisco Certified Entry Network Technician (CCENT)
- Cisco Certified Technician (CCT)

**Associate:** Several associate level certifications exist, focusing on different disciplines (e.g. route/switch, voice, security, or wireless). While specific qualifications vary among the various associate level certifications, someone with one of these certifications is expected to be proficient to work with the corresponding technology in a mid-sized network. Cisco currently identifies the following certifications at the associate level:

- Cisco Certified Design Associate (CCDA)
- Cisco Certified Network Associate (CCNA)
- CCNA Data Center
- CCNA Security
- CCNA Service Provider
- CCNA SP Operations
- CCNA Voice
- CCNA Wireless
- CCNA Video
**Professional:** Like the associate level, the professional level of Cisco certifications span a variety of technical disciplines. In general, someone with a professional level Cisco certification is expected to be able to work independently, in their area of focus, on complex networks. Cisco currently lists the following as recognized professional level certifications:

- Cisco Certified Design Professional (CCDP)
- Cisco Certified Internetwork Professional (CCIP) - RETIRED
- Cisco Certified Network Professional (CCNP)
- CCNP Data Center
- CCNP Security
- CCNP Service Provider
- CCNP SP Operations
- CCNP Voice
- CCNP Wireless

**Expert:** Cisco offers expert level certifications in a variety of technologies, and those who possess these certifications are widely regarded as experts in their field. Cisco currently has the following expert level certifications available:

- Cisco Certified Design Expert (CCDE)
- Cisco Certified Internetwork Expert (CCIE) Route/Switch
- CCIE Data Center
- CCIE Security
- CCIE Service Provider
- CCIE Service Provider Operations
- CCIE Storage Networking
- CCIE Voice
- CCIE Wireless

**Architect:** Currently, Cisco has a single certification at the architect level. That certification is the [Cisco Certified Architect (CCAr)](https://www.cisco.com). This certification represents the highest level of Cisco certification. Only a handful of Cisco professionals have ever reached this level. Cisco won’t even say how many people currently have the certification. My personal guess (and this is just a guess) is that no more than 30 people in the world have achieved this certification. Those with the coveted CCAr certification are not only expected to be able to design complex global networks but also translate a company’s business strategies into corresponding technical strategies.

The certifications listed here represent some of the more popular Cisco certification tracks. However, Cisco does have other certifications. For a current listing of available certifications, click [HERE](https://www.cisco.com).

Cisco professionals often ask me what certification track they should pursue. My recommendation is to focus on technologies you’re interested in, rather than the technologies you perceive to be currently in demand.
The Psychology of Certification
Previous chapters in this book, addressing topics such as goal setting, understanding Cisco documentation, getting your hands on equipment, and time management, are directly applicable to our discussion of certification. For example, you need to start with a goal to earn a specific certification, and then manage your study time, while dealing with life’s distractions.

However, beyond the mechanics of earning a certification, there is a good bit of psychology involved. For example, have you ever been taking an exam and get panicked? Many certification candidates (including me) have. So, let’s take a look at a few quick tips for managing your emotions.

Yawning: You’re sitting there at the testing center (or at a CCIE lab facility). You’ve invested many hours preparing, and you or your company have invested money for you to take this exam. This causes a serious case of nerves in many certification candidates. Certainly, not everyone gets nervous, but many do.

Here’s a quick tip to calm the nerves. It’s something I learned from watching the Winter Olympics several years ago. Apolo Ohno (who has recently gone onto even more fame as a contestant on *Dancing with the Stars*) was a short track speed skater for the USA. Before his races, I noticed he always yawned. This struck me as odd. I mean, he’s at the Olympics, is he bored?! Then, one of the television commentators explained what he was doing. Apolo intentionally yawned before his races to calm his nerves. Apparently, the act of yawning helps release tension in your facial muscles and gives you a nice intake of oxygen. I’ve tried it, and it works for me. So, if you find yourself tensing up in an exam environment, try a couple of slow and relaxing yawns.

Investigative Attempts: One of my fellow students in a CCIE Voice boot camp I attended referred to his first attempt at a CCIE lab as an “investigative attempt.” Let’s face it, the odds are not good. Most CCIE tracks take about three to four attempts on average to pass. However, this guy didn’t go into the lab, on his first attempt, with the anticipation of passing. Instead, his purpose for being in the lab was to learn how the lab was setup, what types of tasks faced him, and how quickly he had to move through the tasks to get done.

Sure, he had put in hundreds of hours of study in preparation for this first attempt, and he very well might pass. However, he mentally took away the pressure of passing by convincing himself that his primary goal was to investigate what the lab was like, so that he could come back and pass on a future attempt.

You might want to adopt this attitude the next time you’re facing a particularly challenging certification exam. Certainly, I’m not suggesting that you do less preparation than you otherwise would, and take an exam just to see what’s on the exam. You should thoroughly prepare before your first attempt. However, if you’re taking a lab or a really tough exam, you might have the mindset that you’ve prepared. Given the right set of questions or tasks, you’re going to pass. You’re committed to eventually passing this exam, and you might pass this first time. However, you’re primary goal on this first attempt is to investigate what’s on the exam.

To Skip or not to Skip: When in the midst of an exam, you might be faced with a particularly challenging or lengthy question or task. A question many exam candidates have at that point is, “Should I
skip this question, just making my best guess and moving on, or should I stick with it until I’ve figured it out?”

As you’re going through different Cisco certification exams, some questions will be tougher than others. On a written exam, you might have simulations. You might have a massive amount of output (e.g. debug output) you have to read through. The fact is, some questions take longer to complete than other questions.

If the exam is one of those where you barely have enough time to get through all of the questions, it’s sometimes wise to skip a question, or make your best guess, and move on. I was taking one exam, and there was a huge amount of debug output on the screen for me to wade through, in an attempt to determine what was causing the troubleshooting issue described in the question. There was so much output on the screen, the exam even provided a search feature, where I could search for particular character strings in the output.

I realized it was going to take a very long time to go through all of that output. However, I thought that I’d done well enough on the other questions to probably still pass, without burning through the ten to fifteen minutes it would take me to answer this one question. So, I skipped it. Well, I didn’t really skip it. I made an educated guess based on the wording of the question and the available answers in the multiple choice question.

The moral of the story is this. Sometimes it’s better to strategically skip a question, if skipping that question will allow you time to answer other questions you otherwise would not have time to answer.

What I do at the beginning of a written exam is determine, on average, how much time I have to complete each question. For example, let’s say that at the beginning of an exam there’s a screen stating that there are 60 questions on the exam and a 90-minute time limit. Some quick math (i.e. 60 / 90 = 1.5) reveals that, on average, you have about one and a half minutes to complete each question. Then, 30 minutes into the exam, and again at the 60-minute mark, you check your pace. For example, let’s say that you’re 60 minutes into the exam, and you’ve answered 50 questions. This means that you’re spending an average of 1.2 minutes (i.e. 60 / 50 = 1.2) on each question. So, you’re ahead of pace and can afford to spend a little extra time if you come upon a particularly challenging question.

If however, if you’re 60 minutes into the exam, and you’ve only answered 40 questions, you’re spending an average of 1.5 minutes (i.e. 60 / 40 = 1.5) on each question. So, you don’t have any extra time to spare. If you encounter a question you believe will take you longer than 1.5 minutes, you might just want to make your best guess, and move on.

**Bonus Video Content!**

I’ve come in contact with many Cisco certification candidates over the years and have noticed three big types of mistakes they make. Please check out this video for some valuable tips on how to avoid these mistakes and be more strategic in your exam preparation.

Check out the video [HERE](#).
A Tale from the Trenches

While writing this chapter, and thinking about the whirlwind of emotions that often accompany an exam attempt, I was reminded of the evening before my second attempt at the CCIE Voice lab. Sitting in my hotel room in RTP North Carolina the evening before the lab, some less than empowering questions made their way into head.

What if I fail?

What if I’ve put in all this effort, spent all this money, took away irreplaceable time from my family, and have nothing to show for it?

Then, I remembered my favorite quotation from Theodore Roosevelt. It was a quote that I framed and had hanging in my office for years while I was working at Eastern Kentucky University. The quote goes like this:

It is not the critic who counts; not the man who points out how the strong man stumbles, or where the doer of deeds could have done them better. The credit belongs to the man who is actually in the arena, whose face is marred by dust and sweat and blood; who strives valiantly; who errs, who comes short again and again, because there is no effort without error and shortcoming; but who does actually strive to do the deeds; who knows great enthusiasms, the great devotions; who spends himself in a worthy cause; who at the best knows in the end the triumph of high achievement, and who at the worst, if he fails, at least fails while daring greatly, so that his place shall never be with those cold and timid souls who neither know victory nor defeat.

- Theodore Roosevelt

Suddenly, I was comforted, knowing that no matter what happened in the lab the following day, I had spent myself in a worthy cause. I had known the great enthusiasms, the great devotions. If passed, then I would know the triumph of high achievement, but if I failed, I would do so while daring greatly. My place would never be with those cold and timid souls who know neither victory nor defeat.

The next day, I entered the arena. I was fortunate to pass and to know the triumph President Roosevelt spoke of. He referred to this complete devotion to a cause as being “in the arena.” I invite you to join me there.

If you truly feel this book added value to you and your career, please let others know by rating it on this book’s Amazon page. Thank You!
Recommended Study Resources for CCNA Certification

Watch It

**Cisco CCNA (200-120) Complete Video Course by Kevin Wallace**
This is a video training series that I personally did for Pearson IT Certification. It covers all of the CCNA exam blueprint topics, includes approx. 300 videos, and has over 26 hours of instruction.

More info available [HERE](#).

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Read It / Do It

**Cisco CCNA Routing and Switching 200-120 Official Certification Guide and Network Simulator by Wendell Odom**
Wendell Odom is one of the most respected authors of Cisco networking books in the world. So, you can trust this book to help you master all of the topics on the CCNA (200-120) exam. This comprehensive library of products includes his CCENT (ICND1) and ICND2 official certification guides. It also includes a network simulator with tons of lab exercises that give you plenty of hands-on experience.

More info available [HERE](#).
Keep in Touch with Kevin

I am deeply honored you’ve invested your time in reading this book. My sincere desire is that in years to come, you’ll be able to look back over your successful career and identify the reading of this book as a key stepping-stone.

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Kevin Wallace, CCIEx2 (R/S and Collaboration) #7945, is a Certified Cisco Systems Instructor (CCSI #20061), and he holds multiple Cisco certifications, including CCNP Voice, CCSP, CCNP, and CCDP, in addition to multiple security and voice specializations. With Cisco experience dating back to 1989 (beginning with a Cisco AGS+ router running Cisco IOS 7.x), Kevin has been a network design specialist for the Walt Disney World Resort, a senior technical instructor for SkillSoft/Thomson NETg/KnowledgeNet, and a network manager for Eastern Kentucky University. Kevin holds a bachelor's of science degree in electrical engineering from the University of Kentucky. Kevin lives in central Kentucky with his wife (Vivian) and two daughters (Stacie and Sabrina).