

BUC73105 · TOPIC 1

Who keeps it all running?

Introduction to Network and System Administration

Have your laptop or phone ready. You will be typing today.

LET'S START HERE

Everything just stopped.

1

Mobile money is down.

It is month end.

2

The student portal crashed.

It is registration day.

3

No Wi-Fi in the whole building.

Nobody knows why.

4

The hospital cannot find your file.

You are already inside.

IN THE CHAT

Which one would ruin your day? Type 1, 2, 3 or 4.

Somebody, somewhere, is being blamed for each of these. That person is a system administrator.

YOUR CHOICE · YOU KEEP IT ALL SEMESTER

Pick your kingdom.

Choose the place you will run for this whole course. Every task you do will be about your choice.

A campus

Labs, portal, Wi-Fi, 4,000 students

A bank or mobile money shop

Money moves. Nothing may be lost

A hospital

Records, and they are needed now

A gaming café

60 machines, all busy, all evening

A church or NGO

Small budget, big Sunday

Your own hustle

Whatever you are building

POLL

Pick one now. Write your choice in the chat so I can put you in a group.

THE WHOLE JOB, IN ONE LINE

Keeping other people's technology working.

That is it. Everything else is detail.

PEOPLE

Who uses it. Who breaks it. Who complains.

MACHINES

Computers, servers, cables, phones, cloud.

RULES

What is allowed, and who decided.

Three administrators you could meet this week

SARAH

A secondary school

120 computers. One person: her.

“I am the ICT teacher and I am also the whole ICT department.”

Hardest part: nothing broken ever gets replaced.

DENIS

A telecom company

A team of fourteen. Night shifts.

“I have never met a single one of our users.”

Hardest part: one change at 2 a.m. touches a million people.

PROSSY

Freelance, seven clients

A clinic, two schools, a hardware shop.

“I drive between them all week.”

Hardest part: nobody writes anything down — including her.

Same job title. Completely different days. Which of the three sounds most like the life you want?

What an administrator is NOT

Not a programmer

You will read code and write small scripts. You will not be building apps all day.

Not the repair technician

Cracked screens, dead batteries and broken keyboards are somebody else's trade.

Not “the computer person”

You are not there to fix every relative's private laptop for free. Learn to say no kindly.

Not invisible

The day it breaks, every single person suddenly knows your name and your phone number.

Knowing what the job is NOT is how you avoid doing three jobs for one salary.

SIX WORDS WE WILL USE EVERY WEEK

Learn these six words now

HOST

Any machine on a network.
Your laptop is a host.

SERVER

A machine that serves others.
Same parts. Different job.

CLIENT

The machine doing the asking.
Your phone opening WhatsApp.

SERVICE

The thing being served.
Email, the portal, printing.

ACCOUNT

Who you are to the machine.
Your name plus your permissions.

UPTIME

How much of the time it works.
Usually written as a percentage.

If you are ever lost this semester, it is usually one of these six words. Ask.

What makes a server a server?

YOUR LAPTOP

One person uses it

You switch it off at night

You install what you like

If it dies, you are annoyed

A SERVER

Hundreds use it at once

It is never switched off

Nothing is installed casually

If it dies, 400 people stop working

Same components inside. The difference is not the hardware — it is how many people depend on it.

TWO JOB TITLES YOU WILL HEAR

Machines, and the roads between them.

SYSTEM ADMIN

Looks after the machines.

Servers · accounts · files · backups · software

Breaks as: "the server is full"

NETWORK ADMIN

Looks after the roads.

Wi-Fi · cables · routers · addresses · the internet link

Breaks as: "there is no internet"

In a small place, it is the same person doing both. Probably you, in about two years.

What is a network, actually?

Follow one click. This is what happens between your laptop and Google.

1 Your laptop

A host. It has an address and a network card.

2 The wall port or Wi-Fi access point

Where your machine actually joins the network.

3 The switch

Joins every machine inside this one building.

4 The router

The door out. It knows how to reach other networks.

5 The ISP link

The road to the world. MTN, Airtel, Roke, NITA-U.

6 Google's server

Somebody else's system administrator worries about this one.

Steps 2 to 5 are the network administrator's world. Steps 1 and 6 belong to a system administrator.

Six more words

IP ADDRESS

The machine's address.
Like 192.168.1.15

SWITCH

Joins machines inside
one building.

ROUTER

Joins your network
to another network.

ACCESS POINT

The Wi-Fi radio.
The wireless wall socket.

GATEWAY

The way out.
Usually the router's address.

DNS

Turns names into addresses.
google.com → 142.250.x.x

Switch joins. Router connects networks. That one difference is asked in almost every job interview.

Who is the network administrator?

What they own

Cables, switches, routers, access points, addresses, and the link to the ISP.

The question all day

“Can the right traffic get from here to there, fast enough?”

What they are judged on

Can people connect? Is it fast? Did the internet stay up this month?

What wakes them at night

A dead link, a loop, one room offline, or an uplink that is completely full.

Who they argue with

The ISP — who will always say the fault is on your side.

They rarely touch a user's computer. They own everything in between computers.

LEARN THIS TABLE — IT IS EXAMINABLE AND IT IS ASKED AT INTERVIEW

System admin vs network admin

	SYSTEM ADMINISTRATOR	NETWORK ADMINISTRATOR
What they own	The machines, and what runs on them	The links between the machines
The question	Is this machine doing its job, safely?	Can traffic get there, fast enough?
Where they work	Servers, desktops, accounts, files	Switches, routers, access points, cables
Their tools	Terminal, PowerShell, services, backups	IP plans, ping, tracer, Packet Tracer
A bad day	“The server is full.” “The data is gone.”	“There is no internet in Block C.”
The certificate	Microsoft AZ-104, Linux RHCSA	Cisco CCNA

In a big organisation these are two different people. In a small one, both jobs — and one salary.

SAME BUILDING, SAME DAY

Two people, one Monday

THE SYSTEM ADMINISTRATOR

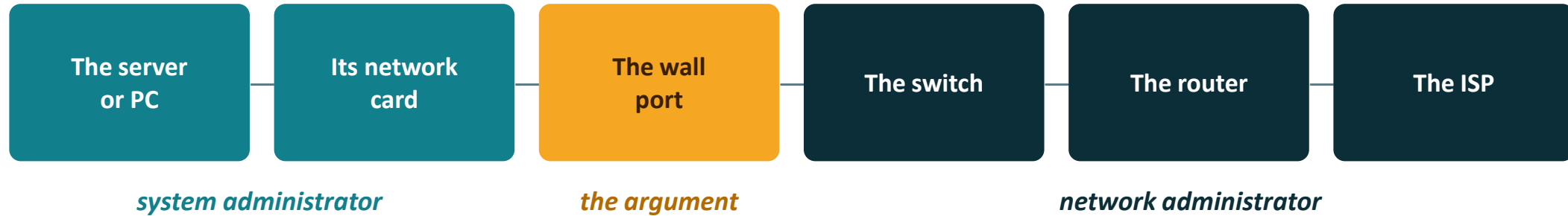
- 8:00** Did last night's backup finish?
- 10:00** Patch the file server in the agreed window
- 12:00** Two new staff: accounts, email, permissions
- 15:00** Restore a file a lecturer deleted on Friday

THE NETWORK ADMINISTRATOR

- 8:00** Is every link still up? Any errors overnight?
- 10:00** Install and configure a new switch in Block C
- 12:00** Chase the ISP: the internet is slow again
- 15:00** Wi-Fi keeps dropping in the library. Find out why

They only meet when something breaks — and each one is certain it is the other's fault.

Where one job ends and the other begins



The complaint

“This machine will not connect.” Both of them get phoned. Both suspect the other.

How professionals settle it

Put a different machine on the same port. Put the same machine on a different port.

What that proves

If the port works for another machine, it is the machine. If it does not, it is the network.

Good administrators do not argue about blame. They halve the problem until it is obvious.

DO IT NOW

10 MIN

Watch your traffic leave the building

One command shows you every stop between your machine and Google.

```
tracert google.com      (Windows)
traceroute google.com   (Mac and Linux)
```

Then answer these four:

- 1 How many stops (hops) are there in total?
- 2 Which line is your own router? Usually 192.168.something.1
- 3 Which hop is your ISP — MTN, Airtel, Roke?
- 4 Where does the time suddenly jump? That is your slow point.

Post in the chat

Your hop count, and the name of your ISP as it appears.

We will compare. Some of you are three hops from Google. Some are fifteen.

If you only see stars (* *), the network is blocking it. That is information too — write it down.*

JOB TITLES YOU WILL SEE WHEN YOU START APPLYING

Really, there are five jobs

System admin

The machines. Servers, accounts, files, backups, software.

Network admin

The roads. Wi-Fi, cables, routers, addresses, the internet link.

Security admin

The locks. Who may enter, what they may touch, what gets watched.

Service desk

The people. Answers the phone, logs the problem, resets the password.

In a small organisation, one person does all five. Employers pay for people who can.

WHAT THE JOB IS REALLY MADE OF

Three skills, not one

TECHNICAL

What you can do

Operating systems, networks,
commands, hardware, backups.

PEOPLE

How you handle them

Explaining without insulting.
Saying no. Staying calm while
being shouted at.

JUDGEMENT

What you decide

What to fix first. What to change.
What risk is acceptable today.

Almost nobody loses this job because of the first column. They lose it because of the second and third.

POLL

5 MIN

Who fixes it?

Four things went wrong. For each one, vote: system, network, security, or not IT at all.

- 1 Wi-Fi works in Block B but not Block C.
- 2 A lecturer forgot her password on exam day.
- 3 Someone copied the student database to a flash disk.
- 4 The server filled up at 3 a.m. and payroll did not run.

Your options

A System

B Network

C Security

D Not IT

There is no perfect answer. Argue for yours.

What a sys admin looks after

1

Computers

2

People's accounts

3

The network

4

Email, portal, apps

5

Backups

6

Security

7

Watching for trouble

8

Writing it down

Keep this list next to you for the next activity.

What each one really means

WHAT IT IS

WHAT YOU DO

WHEN IT GOES WRONG

1 Computers

Set them up, update them, replace them

“It is slow.” “It will not start.”

2 Accounts

Create them, change them, remove them

A person left last year. His account still works.

3 The network

Addresses, Wi-Fi, cables, the internet link

“There is no internet” — in one room only.

4 Services

Email, the portal, printing, databases

The portal is down. It is registration week.

And the four everyone forgets

WHAT IT IS

WHAT YOU DO

WHEN IT GOES WRONG

5 Backups

Copy the data — then test the copy

The backup existed. Nobody had ever restored it.

6 Security

Decide who enters and what they may touch

One password. Everybody knows it.

7 Monitoring

Know before the user phones you

The disk filled at 3 a.m. Nobody was told.

8 Writing it down

Record what exists and what you changed

Only one man knows how it works. He travelled.

These four are boring, invisible, and they are where organisations actually fail.

GO AND LOOK

7 MIN

Hunt in your own house.

Stand up. Take your phone. Find these four things where you are sitting right now.

How many things are on your Wi-Fi?

Phones, TV, laptops, the neighbour...

Where is your router?

Take a photo of it.

Who knows the Wi-Fi password?

Count the people. All of them.

What happens when power goes?

Does anything stay on?

Come back and post in the chat: your number of devices + one photo.

You just did an audit.

That is genuinely the first thing an administrator does in a new job: find out what exists, and who is responsible for it.

Most homes

have more devices than the owner can name

Most small offices

have no list of what they own

Almost nobody

knows who holds the passwords

Your kingdom has the same problem. Fixing it is your job now.

What an audit gives you

Every administrator keeps a list like this. It is not exciting. It is the most useful page in the building.

Tag	What it is	Where	Who owns it	Last checked
LAB-01	Desktop, Windows 11	Lab A, row 1	ICT department	12 Aug
SW-01	Switch, 24 ports	Lab A, wall box	ICT department	not known
RTR-01	Router to the ISP	Store room	nobody — gap!	never

Look at the last row. No owner, never checked. That is the one that will fail first, and nobody will be responsible.

You will build one of these for your kingdom, and keep it all semester.

WHAT ARE WE EVEN AIMING FOR?

Four things people want

ALWAYS ON

It works when I need it

FAST ENOUGH

I am not sitting waiting

SAFE

Nobody steals or breaks
my stuff

AFFORDABLE

We can actually pay for it

IN THE CHAT

For your kingdom: which one matters most? Why?

You cannot have all four at the top. That choice is the job.

PART 3

How do they work?

Not the theory — the actual hours, the actual queue, the actual thinking.

- A normal Tuesday, hour by hour
- How work reaches you, and which problem you take first
- The four people you must handle, not just the machines
- How an administrator thinks when something breaks

A normal Tuesday

8:00 a.m.

Check the alerts. Did last night's backup actually run?

8:30 a.m.

Open the queue. Fourteen problems are waiting. Which three matter?

10:00 a.m.

Planned change: update the file server, in the agreed window

12:00 noon

Two new staff started. Accounts, email, laptop, permissions

2:00 p.m.

Block C loses Wi-Fi. Find it, fix it, write down what caused it

4:00 p.m.

Update the notes, close the tickets, hand over to the evening person

Notice: almost none of it is installing something new. It is checking, deciding, fixing and recording.

Everything becomes a ticket

A ticket is just a record

Who reported it, what happened, when, and what you did about it.

Why bother writing it?

So nothing is forgotten, so you can prove what happened, and so somebody else can continue your work.

Which one first?

Not the loudest person. Count how many people are stopped, and how badly.

One lecturer cannot print vs. four hundred students cannot log in. Same day. Which do you do first?

The person who shouts loudest is not automatically first. That is a decision you will defend often.

THE HALF OF THE JOB NOBODY WARNS YOU ABOUT

Four people you handle every week

Users

Want it working now. Did not read the notice you sent.
Will call you, not the help desk.

Management

Wants it cheap. Asks “why do we need this?” about the thing that prevents disasters.

Vendors and the ISP

Will tell you the fault is on your side. You must arrive with evidence, not complaints.

Other administrators

The people who will answer your call at midnight. Treat them well for years before you need them.

Half of this job is machines. The other half is these four conversations, repeated forever.

How an administrator thinks when it breaks

1 What changed?

Systems rarely break on their own. Something was updated, moved, unplugged or “improved”.

2 Who else is affected?

One person, one room, or everybody? That single answer removes half the possible causes.

3 What does the machine say?

Read the error and the logs. Do not guess. The machine usually tells you, in bad English.

4 Change one thing. Then test.

Change five things and it may work — and you will never know which one, or how to do it again.

5 Write down what fixed it.

You will meet this same fault again, at a worse moment, probably at night.

Guessing works sometimes. Method works every time — and it teaches you something you keep.

An administrator's toolkit

ON THE MACHINE

Terminal or PowerShell

VirtualBox — practise without breaking anything

Cisco Packet Tracer — build networks that do not exist

Remote desktop — fix a machine you are not sitting at

A ticket system — even a shared spreadsheet counts

A password manager — never a notebook, never

WhatsApp

IN THE BAG

A laptop you can trust

A USB stick with installers on it

A network cable, and a way to test it

A small screwdriver set

The ISP's phone number and your account number

A notebook — yes, still

By the end of this course you will own everything in the left column. All of it is free. Start tonight.

DO IT NOW

8 MIN

Type this. Right now.

Open Command Prompt (Windows) or Terminal (Mac/Linux). Type one line at a time.

```
hostname
```

What is this computer called?

```
ipconfig / ip a
```

What is its address on the network?

```
ping 8.8.8.8
```

Can it reach the outside world?

Screenshot it.

Paste it in the chat.

First five get a shout-out.

Nothing here changes your computer. These commands only ask questions.

CONGRATULATIONS

You just ran your first admin commands.

Keep these three. You will use them in every topic from now on.

`hostname`

The name of this machine

`ipconfig` (Windows) / `ip a` (Mac,
`Linux`)

Its address on the network

`ping 8.8.8.8`

Whether it can reach the internet

Try one of them on a different device tonight. A friend's laptop. Your phone's hotspot page. Anything.

What those commands told you

The name

In a room of sixty machines, “the one near the window” is not a name. LAB-A-14 is.

192.168.x.x

A private address. It works inside your building only, not on the open internet.

The gateway

The door out. If this is wrong or missing, you have Wi-Fi but no internet.

ping time

How long the reply took, in milliseconds. Small is good.

Request timed out

Something between you and there is broken. Now you start narrowing it down.

Three commands, and you already know more about that machine than the person who owns it.

WHY THIS COURSE IS WORTH YOUR TIME

Where this can take you

Service desk

Where almost everyone starts. Nothing wrong with it.

Systems administrator

The servers, the accounts, the backups. This course.

Network administrator

The links between sites. Add Cisco skills.

Cloud administrator

The same job on AWS or Azure. Add scripting.

Security analyst / IT manager

Where the work becomes decisions, not commands.

Every organisation with more than twenty computers needs one of you. Banks, hospitals, schools, telecoms, NGOs, government.