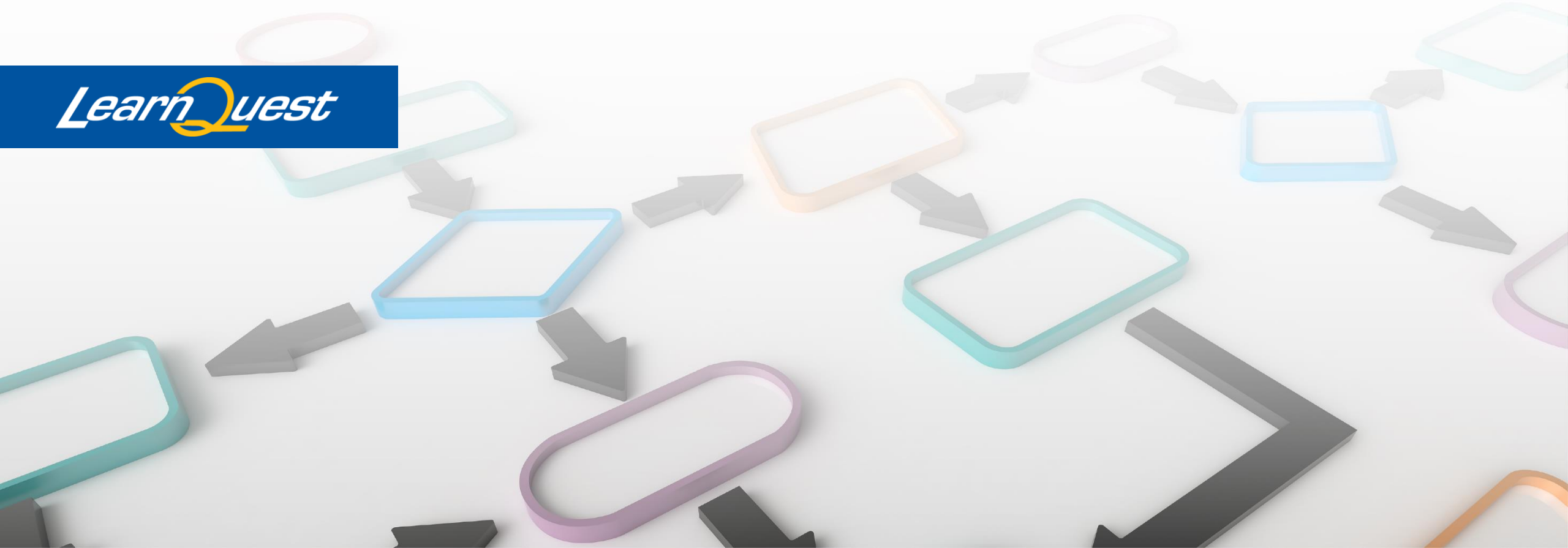
Linux Fundamentals

- 1st Course in Linux Foundations Specialization



Linux Services

In the second module of this course, we will discuss the services available in the Linux operating system. We will explore many services including web servers and database servers, among others.

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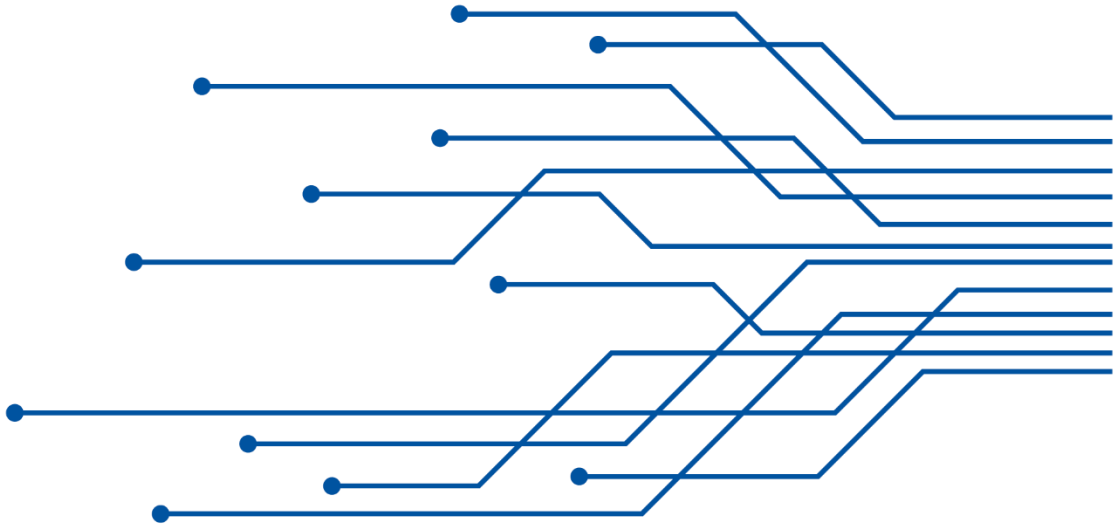


Learning Objectives

Linux Services

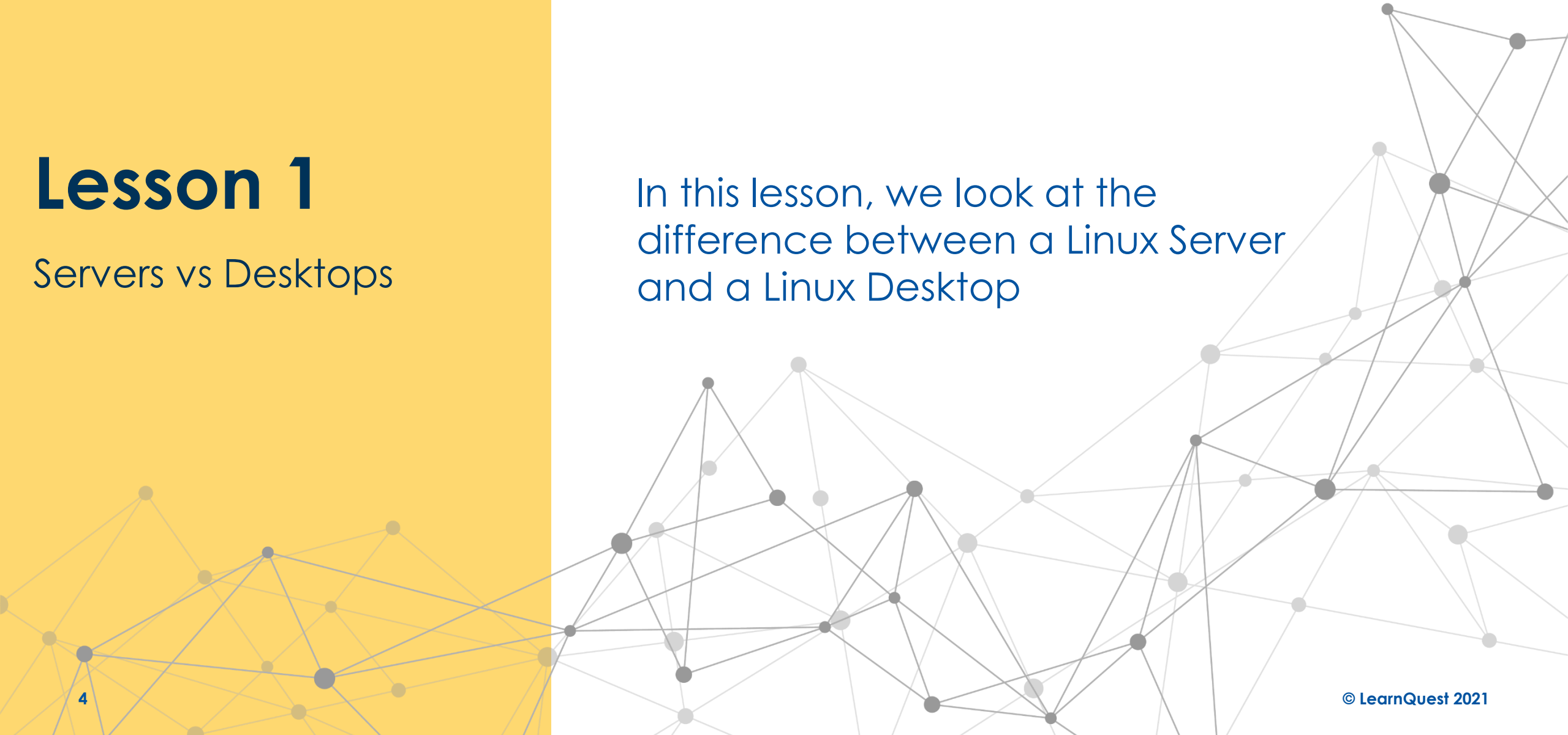
Upon completion of this module, learners will be able to:

- List several services provided by the Linux operating system
- Describe several Web Servers available in Linux
- Describe several Database Servers available in Linux
- Start and Stop services

Lesson 1

Servers vs Desktops

In this lesson, we look at the difference between a Linux Server and a Linux Desktop



Servers vs Desktops

Servers

Focus on programs that provide shared resources (services)

Desktops

Focus on programs that run in a Graphical User Interface (GUI)

Launching Services

There are two primary ways Servers run service programs

As a background process, always running listening for requests

As a process spawned by a parent program that listens for requests

What is Deamon?

When a Linux services runs continually as a background process it is called a deamon.

Linux deamons often end with the letter d. For example, mysqld.

Major Service Types

- File Servers
- Print Servers
- Web Servers
- Database Servers
- Mail Servers
- Network Resource Servers (DHCP, logging, etc.)

Lesson 1 Review

A Linux Desktop has programs designed around GUI interactive applications

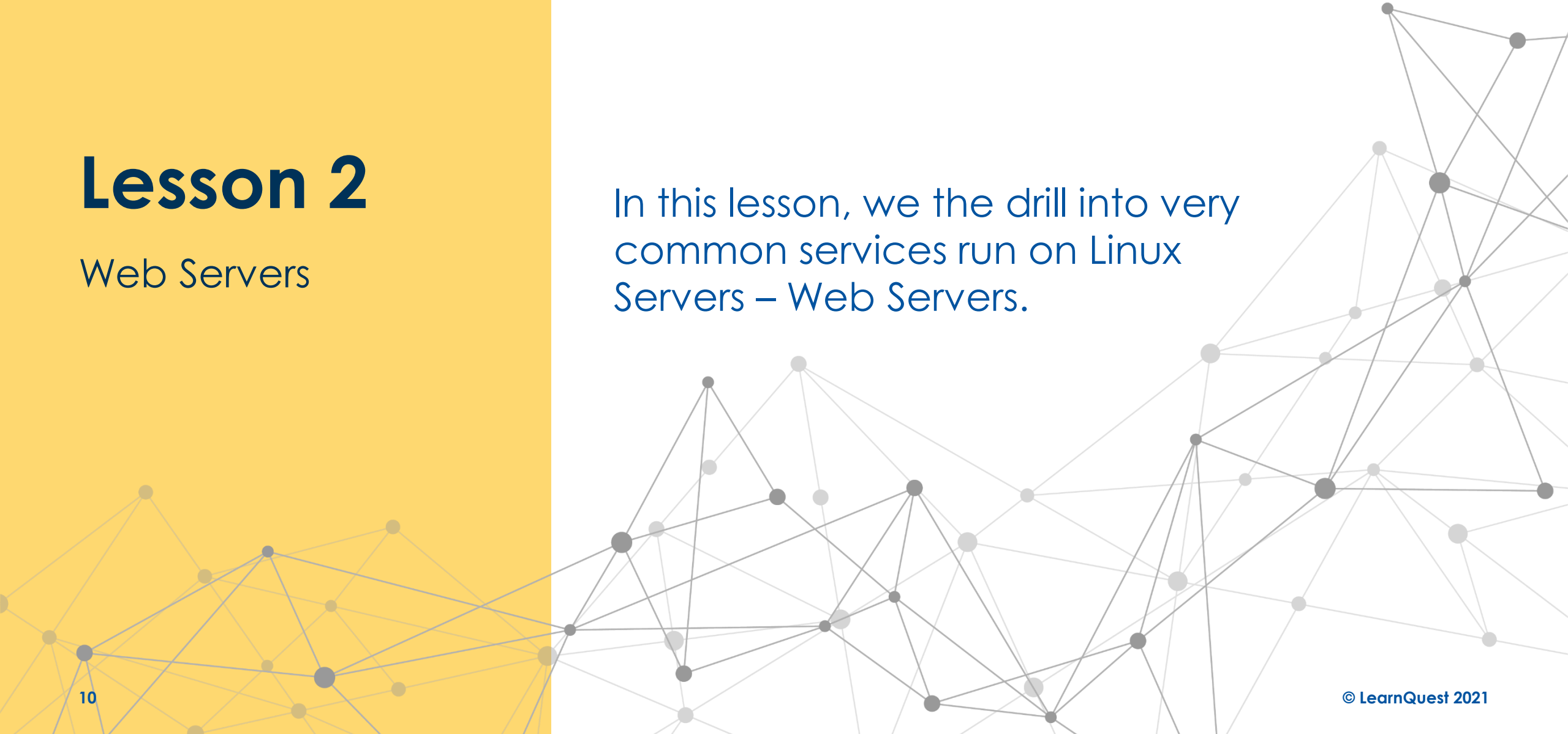
A Linux Server has programs designed around background services that share resources

Deamons often end with the letter “d” in their name

Lesson 2

Web Servers

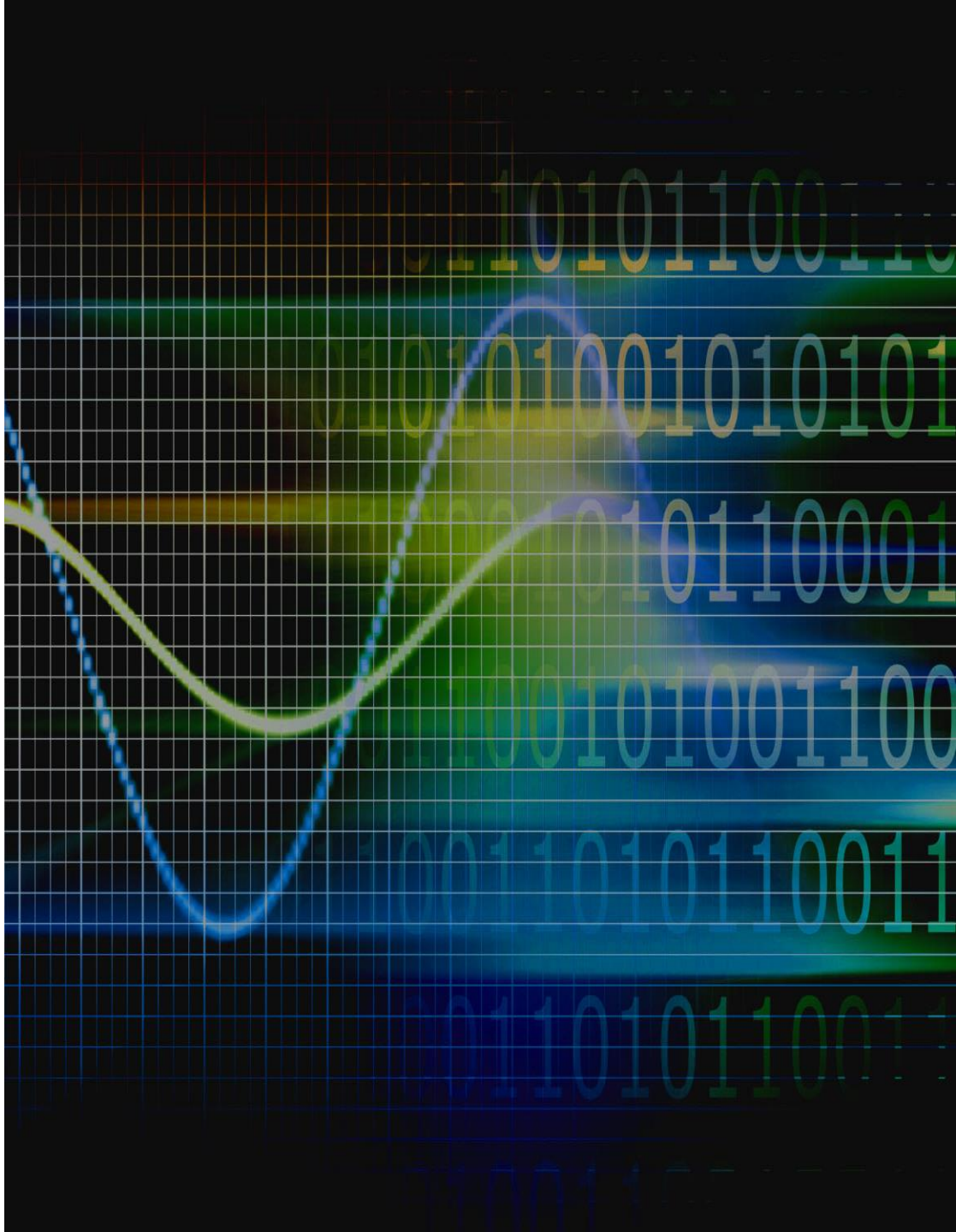
In this lesson, we the drill into very common services run on Linux Servers – Web Servers.



Web Servers

Web Servers Listen on Port 80 and 443 for an incoming request and assign the request to a process to return the response

- Apache
- nginX
- Lighttpd



Apache

Free and open-source cross-platform web server software, released under the terms of Apache License 2.0

Initial Release - 1995

Compiled modules extend the core functionality with things like Server-Side Languages (PHP, Perl, Python, Tcl, etc.)

Apache uses .htaccess for its configuration

First web server software to serve more than 100 million websites - 2009

313 Million Web Servers run Apache as of April 2021

nginX

Free and open-source cross-platform web server software, released under the terms of FreeBSD License

Initial Release – 2004

Owned by F5 Networks

Nginx's modular event-driven architecture can provide predictable performance under high loads (build time)

432 Million Web Servers run nginX as of April 2021

Lighttpd

Free and open-source web server software optimized for speed-critical environments, released under the terms of FreeBSD License

Initial Release – 2015

Lighttpd was used in the past by several high-traffic websites, including YouTube

Around 33 Million Web Servers run Lighttpd as of April 2021

Lesson 2 Review

Web Servers run in the background and serve HTTP and HTTPS requests

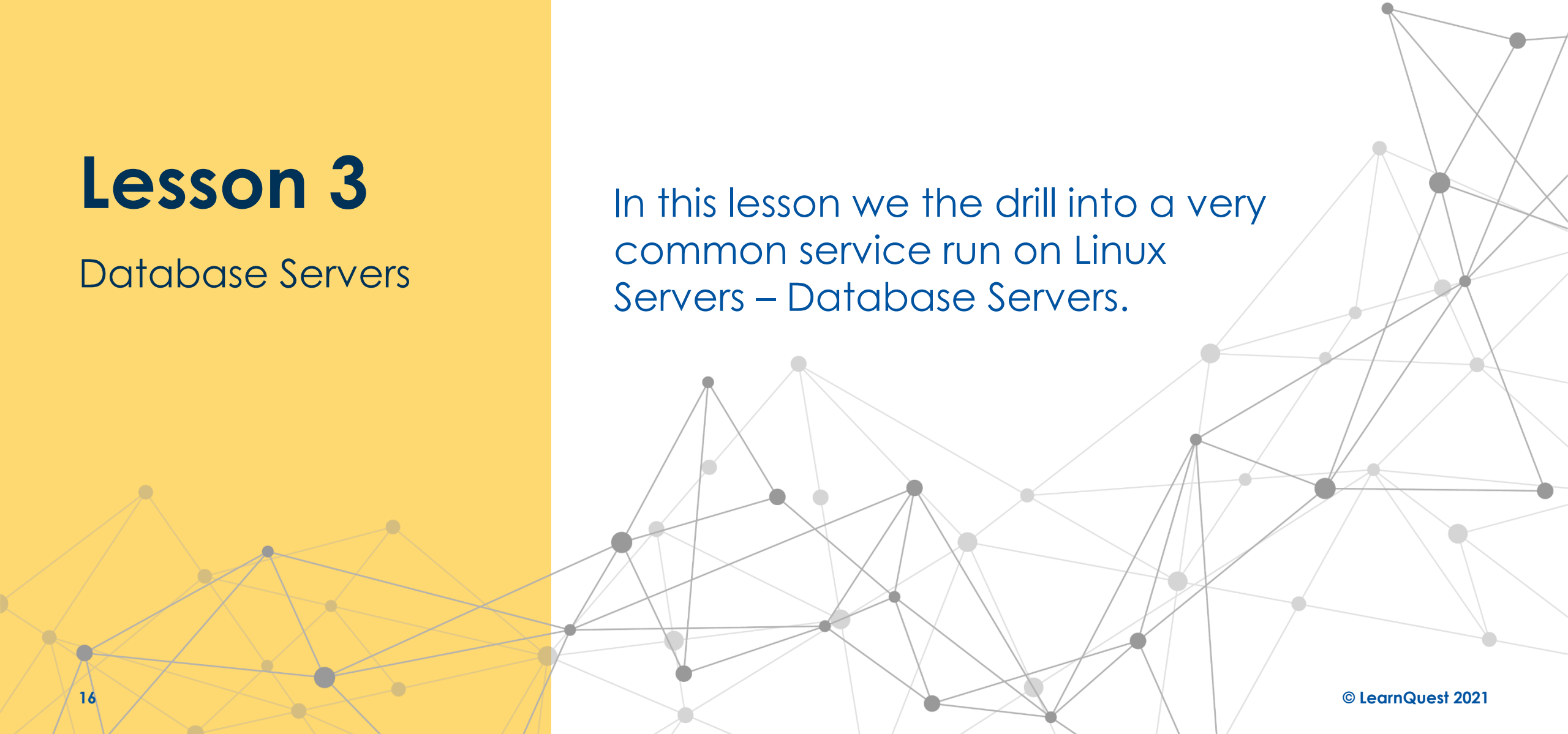
Apache is used by more shared hosting providers

nginX has taken a lot of the web server market because of its performance

Lesson 3

Database Servers

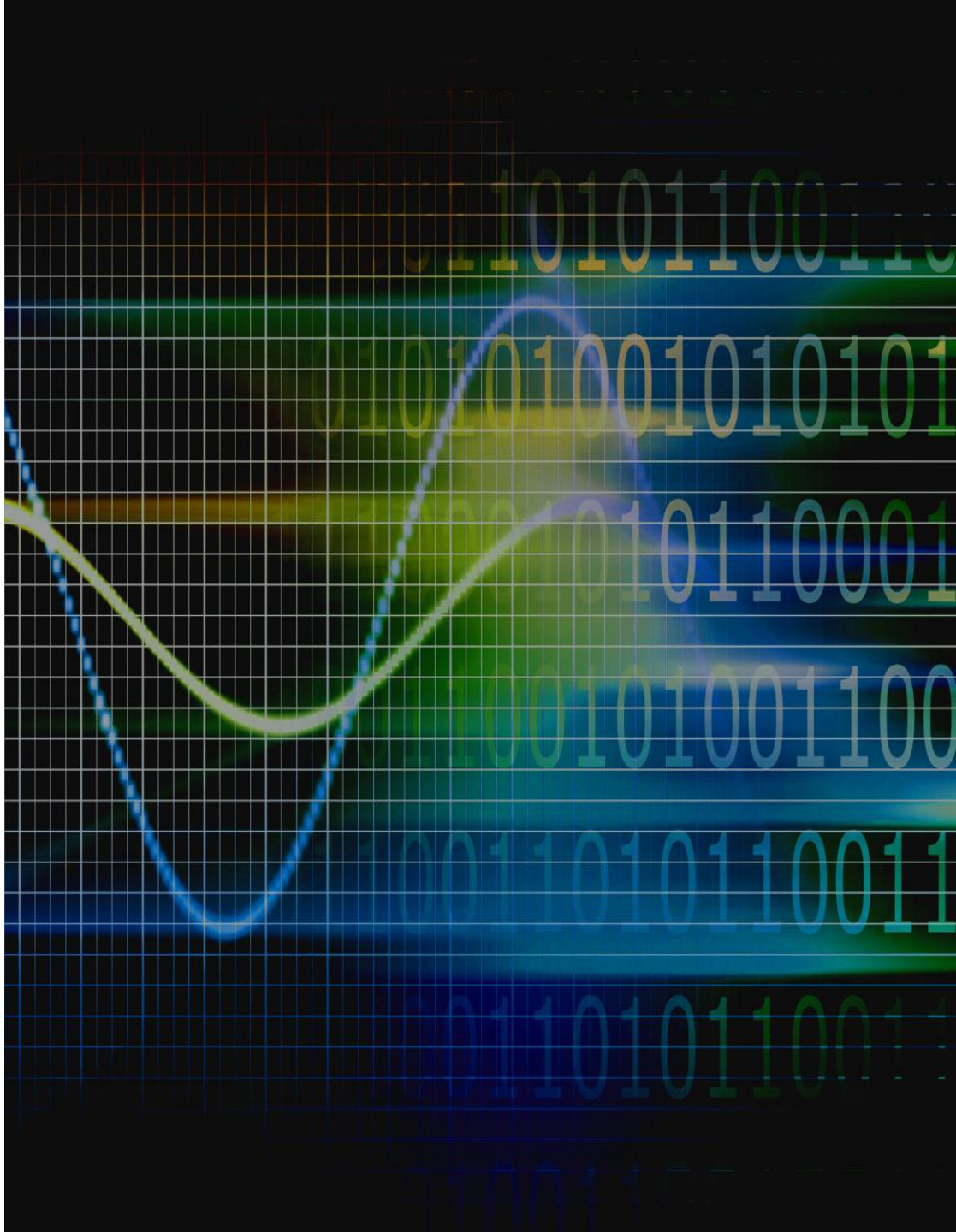
In this lesson we the drill into a very common service run on Linux Servers – Database Servers.



Database Servers

Database Servers Listen on the network for incoming request (often SQL) and respond with the data

- Relational
  - PostgreSQL
  - MySQL
- NoSQL
  - MongoDB



Relational Database Model

Dominant database model used in business applications

Organized in two-dimensional tables

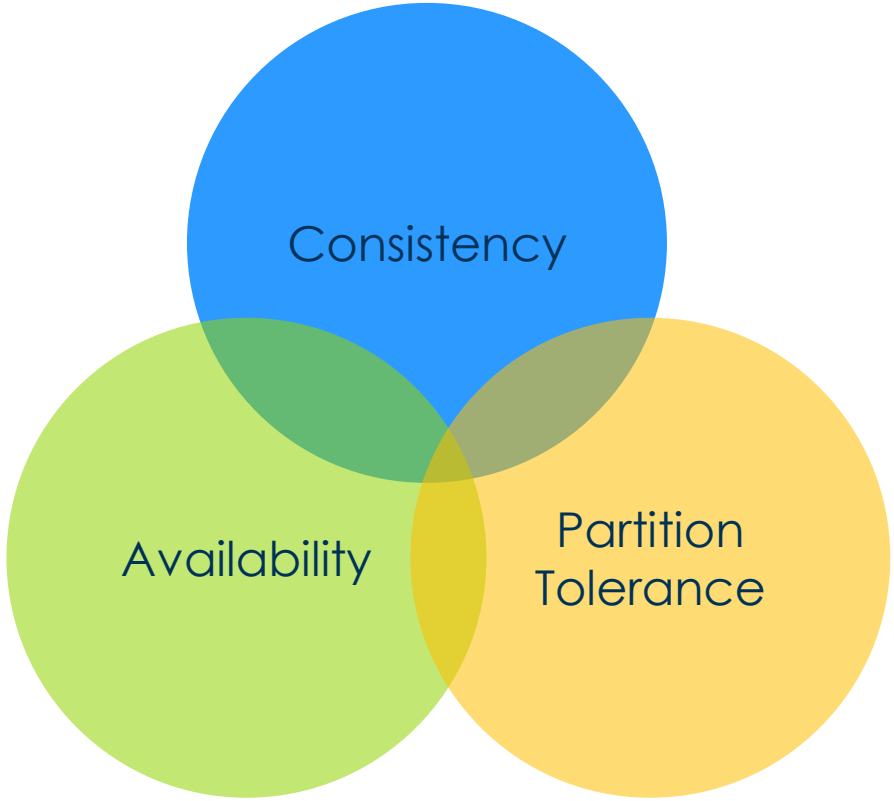
- Entity: a distinguishable component of system
- Example: an employee, a customer, or a rug for sale
- Tuple: a row of a relational table
- Attribute: category of a field
- Primary key: attribute(s) that uniquely identify a tuple

SQL (Structured Query Language)

- Standard query language for DBMS
- Use SQL queries to retrieve data according to some criteria
- Example 1: retrieve name, phone, and email for customers in a specific zip code
- SELECT name, phone, email FROM customers where zip_code = '02176'

NoSQL Database Model

- Often Document Oriented
- CAP Theorem (Only two of the following)



CRUD

- Standard Operations on facts in a database include:

Create

Read

Update

Delete

Lesson 3 Review

Both Relational and NoSQL Support CRUD operations

Relational is Transactional Focused

NoSQL is Document Focused

Lesson 4

Managing Services

In this lesson, we look at managing services in Linux

Init Process

Init program or systemd is the parent process for every process

which init will show the location of the init process

readlink –f /usr/sbin/init

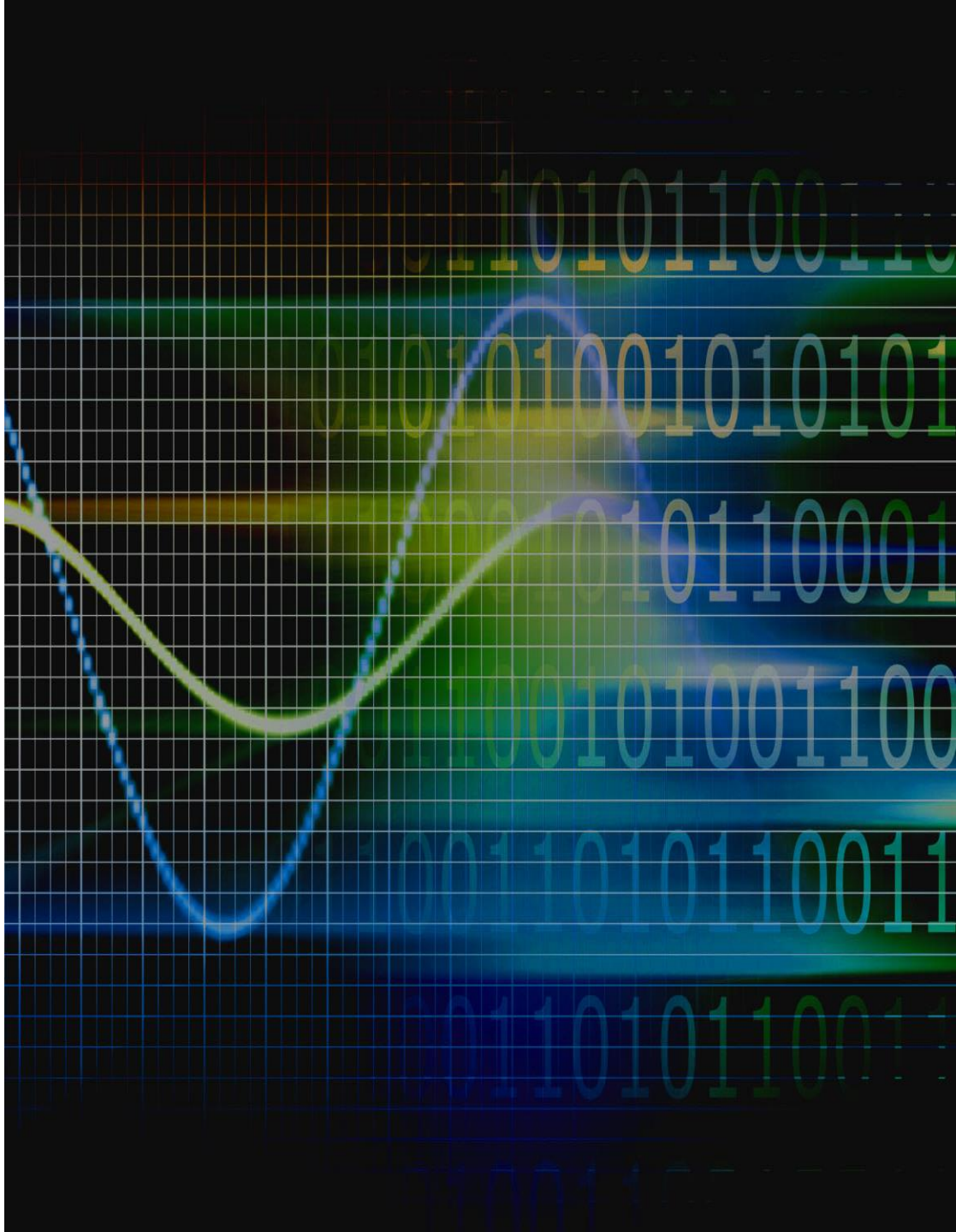
Systemd

Systemd is a software suite that provides an array of system components for Linux operating systems.

Its main aim is to unify service configuration and behavior across Linux distributions

Managing Services with Systemd

- sudo systemctl start [application.server]
- sudo systemctl stop [application.server]
- sudo systemctl restart [application.server]
- sudo systemctl reload [application.server]
- sudo systemctl enable[application.server]
- sudo systemctl disable[application.server]
- sudo systemctl status[application.server]



Lesson 4 Review

Systemd is the new standard for service configuration

The Which Init command will allow you to see where your process init is located

The readlink will allow you to see what process controls your service configuration