

# n8n Complete Training Guide

From Zero to Automation Expert

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|---------------------|------------------------------|
| <b>Prepared For</b> | Greg - Community Place       |
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# Module 1: What is n8n?

## 1.1 Overview & Why n8n

n8n (pronounced "nodemation") is a workflow automation platform that lets you connect different apps and services together without writing code. Think of it like building a chain of actions: when something happens in App A, automatically do something in App B, then App C, and so on.

For example, you could build a workflow that watches your Google Drive for new PDF files, uses AI to read the filename, automatically sorts it into the right folder, and sends you a Slack notification -- all without you lifting a finger.

### Why n8n over other tools?

| Feature          | n8n                          | Zapier                     | Make                   |
|------------------|------------------------------|----------------------------|------------------------|
| Pricing          | Free tier + affordable cloud | \$20+/mo, per-task pricing | \$9+/mo, per-operation |
| Code Access      | Full JavaScript/Python       | Very limited               | Limited                |
| Self-Host Option | Yes (Docker)                 | No                         | No                     |
| AI Integration   | Native AI nodes              | Basic                      | Basic                  |
| Open Source      | Yes                          | No                         | No                     |
| Complexity       | Handles complex logic        | Simple workflows best      | Medium complexity      |

**KEY CONCEPT:** n8n lets you automate repetitive tasks by connecting apps together visually. No coding required for basic workflows, but full code access when you need it.

## 1.2 n8n Cloud vs Self-Hosted

You're using **n8n Cloud** at [communityplace.app.n8n.cloud](https://communityplace.app.n8n.cloud). This means Anthropic... er, n8n hosts everything for you -- no server setup, no Docker, no maintenance. Your workflows run 24/7 on their servers.

| Aspect      | n8n Cloud (You)              | Self-Hosted                      |
|-------------|------------------------------|----------------------------------|
| Setup       | Sign up and go               | Install Docker, configure server |
| Maintenance | Handled by n8n               | You manage updates               |
| Uptime      | 99.9% SLA                    | Depends on your server           |
| Cost        | Monthly subscription         | Server costs only                |
| Best For    | Getting started, small teams | Large orgs, data privacy needs   |

## 1.3 Your n8n Dashboard Tour

When you log into n8n, here's what you see:

### Step 1: Left Sidebar

This is your navigation panel. The icons from top to bottom are:

- **+ (Plus)** -- Create a new workflow
- **Search** -- Find workflows, nodes, or credentials
- **Workflows** -- Your main workflow list
- **Home** -- Dashboard overview with stats
- **Templates** -- Pre-built workflows you can import
- **Credentials** -- Manage your app connections
- **Executions** -- History of workflow runs
- **Settings** -- Account and team settings

### Step 2: Main Area

This shows your workflow list with names, last updated dates, and status (active/inactive).

### Step 3: Top Right

Create Workflow button and your profile.

## 1.4 Key Terminology

Before we go further, let's define the essential terms you'll see everywhere in n8n:

| Term       | What It Means                                  | Real-World Analogy                       |
|------------|--|--|
| Workflow   | A complete automation (the whole thing)        | A recipe from start to finish            |
| Node       | One step in the workflow (a box on the canvas) | One instruction in the recipe            |
| Trigger    | The first node -- what starts the workflow     | "When the oven timer goes off..."        |
| Connection | The line between two nodes                     | "...then do this next"                   |
| Execution  | One complete run of the workflow               | Cooking the recipe once                  |
| Credential | Login info for an app (API key, OAuth)         | Your username/password for an app        |
| Expression | Dynamic value using {{ }} syntax               | A formula in a spreadsheet cell          |
| JSON       | The data format n8n uses internally            | A structured list of key-value pairs     |
| Pin Data   | Fake test data attached to a node              | Practice ingredients before real cooking |

**TIP:** Don't worry about memorizing all this now. You'll learn each term hands-on as we build workflows together.

# Module 2: Your First Workflow

## 2.1 Creating a New Workflow

Let's build your very first workflow right now. We'll create a simple one that runs manually and shows you how data flows through n8n.

### Step 1: Open n8n

Go to [communityplace.app.n8n.cloud](https://communityplace.app.n8n.cloud) and log in.

### Step 2: Create Workflow

Click the orange **"Create Workflow"** button in the top right corner. You'll see a blank canvas with two options: "Add first step..." or "Build with AI".

### Step 3: Name Your Workflow

Click the name at the top (it says "My workflow") and rename it to **"My First Workflow"**. Always name your workflows clearly!

**TIP:** Good naming convention: describe what the workflow DOES. Examples: "PDF Organizer", "Daily Email Report", "New Lead Notifier". Avoid generic names like "My workflow 4".

## 2.2 Adding Your First Trigger

Every workflow needs a **trigger** -- the event that starts it. Think of it as answering the question: "When should this automation run?"

### Step 1: Click "Add first step"

The trigger panel opens on the right showing all available triggers.

### Step 2: Select "Trigger manually"

This is the simplest trigger -- you click a button to run the workflow. Perfect for learning and testing.

### Step 3: You'll see a node appear

A rounded box labeled "When clicking 'Test workflow'" appears on your canvas. This is your first node!

### Common Trigger Types:

| Trigger              | When It Fires                        | Use Case                           |
|----------------------|--------------------------------------|------------------------------------|
| Manual Trigger       | When you click "Test"                | Testing, one-time tasks            |
| Schedule Trigger     | On a timer (every hour, daily, etc.) | Daily reports, periodic cleanup    |
| Webhook              | When an external app calls a URL     | Form submissions, API integrations |
| Google Drive Trigger | When a file is added/changed         | File processing, PDF organizing    |

| Trigger              | When It Fires                    | Use Case                       |
|----------------------|----------------------------------|--------------------------------|
| Email Trigger (IMAP) | When a new email arrives         | Email automation, lead capture |
| On App Event         | When something happens in an app | Slack message, Notion update   |

## 2.3 Adding Action Nodes

Now let's add a node that actually does something. We'll add a **Set** node to create some test data.

### Step 1: Click the + button

On the right side of your trigger node, click the small **+** button. This opens the node selection panel.

### Step 2: Search for "Set"

Type "Set" in the search box and click on the **Edit Fields (Set)** node.

### Step 3: Configure the Set Node

Click "Add Field" and add these:

- **Name:** greeting | **Value:** Hello, Greg!
- **Name:** today | **Value:** Click the expression button (fx) and type: `{{ $now.toISO() }}`
- **Name:** message | **Value:** This is my first n8n workflow!

**KEY CONCEPT:** The Set node creates or modifies data fields. It's one of the most commonly used nodes -- you'll use it in almost every workflow to prepare data before passing it to other nodes.

## 2.4 Connecting Nodes Together

If you added the Set node via the + button, it's already connected. But here's how connections work in general:

- **Drag from output to input:** Every node has a small dot on its right side (output) and left side (input). Drag from one output to another input to connect them.
- **Data flows left to right:** The trigger is always on the left, and data flows through each node toward the right.
- **One output can connect to multiple inputs:** This creates parallel paths (both nodes run at the same time).
- **Delete a connection:** Click on the line between nodes and press Delete/Backspace.

## 2.5 Testing & Executing

Time to run your workflow and see it in action!

### Step 1: Click "Test Workflow"

The big button at the bottom of the canvas. This runs the entire workflow once.

### Step 2: Watch the execution

You'll see each node light up green as it executes. The data flows through in real-time.

### Step 3: Check the output

Click on the Set node. You'll see the output panel showing your data in a table format with your greeting, today's date, and message.

**TIP:** You can also click "Test step" on individual nodes to test just that node. This is super useful for debugging when a workflow isn't working right.

### What you just learned:

- How to create a workflow and name it
- How triggers start a workflow
- How to add and configure nodes
- How connections pass data between nodes
- How to test and see output data

# Module 3: Triggers Deep Dive

## 3.1 Manual Trigger

The Manual Trigger is the simplest -- it runs when you click "Test Workflow" or "Execute Workflow" in the n8n editor. It doesn't produce any data on its own, so the next node receives an empty item.

**When to use:** Testing, one-off data processing, workflows you'll trigger on demand.

## 3.2 Schedule Trigger (Cron)

The Schedule Trigger runs your workflow automatically on a timer. This is one of the most powerful triggers because it lets you automate recurring tasks.

### Configuration Options:

| Setting      | Example                       | Runs When         |
|--------------|-------------------------------|-------------------|
| Every Minute | Rule: Every minute            | Every 60 seconds  |
| Every Hour   | Rule: Every hour at minute 0  | Top of every hour |
| Every Day    | Rule: Every day at 9:00 AM    | 9 AM daily        |
| Every Week   | Rule: Every Monday at 9:00 AM | Monday mornings   |
| Custom Cron  | 0 9 * * 1-5                   | Weekdays at 9 AM  |

### Cron Expression Cheat Sheet:

Format: minute hour day-of-month month day-of-week

Examples:

0 9 \* \* \* = Every day at 9:00 AM  
0 \*/2 \* \* \* = Every 2 hours  
30 8 \* \* 1-5 = Weekdays at 8:30 AM  
0 0 1 \* \* = First of every month at midnight  
0 9,17 \* \* \* = At 9 AM and 5 PM daily

**WARNING:** Schedule triggers only run when the workflow is **activated** (toggled ON in the top right). They do NOT run while you're just editing!

## 3.3 Webhook Trigger

A Webhook gives your workflow a unique URL. When any app or website sends data to that URL, the workflow runs. This is how you receive data from external services.

### Step 1: Add Webhook Trigger

Search for "Webhook" and add it as your trigger.

## Step 2: Choose Method

GET (retrieve data) or POST (receive data). Most form submissions use POST.

## Step 3: Copy the URL

n8n gives you two URLs:

- **Test URL:** Use while building (only works in test mode)
- **Production URL:** Use in real apps (only works when workflow is activated)

**KEY CONCEPT:** Webhooks are the bridge between n8n and the outside world. Anytime you see 'webhook URL' in another app's settings, that's where you paste your n8n webhook URL.

## 3.4 App Triggers

App triggers watch a specific service for events. When the event happens, the workflow starts automatically.

### Popular App Triggers:

| App Trigger   | Events It Can Watch            | Example Use                     |
|---------------|--------------------------------|---------------------------------|
| Google Drive  | File created, updated, deleted | Process new PDFs automatically  |
| Gmail / Email | New email received             | Auto-categorize incoming emails |
| Slack         | New message in channel         | Bot responses, alerts           |
| Notion        | Page created or updated        | Sync Notion with other tools    |
| GitHub        | New commit, PR, issue          | CI/CD notifications             |
| Google Sheets | New row added                  | Process form submissions        |

## 3.5 Error Trigger

The Error Trigger is special -- it runs a separate workflow when ANY of your other workflows fail. Think of it as your safety net.

- Create a separate workflow with an Error Trigger
- Add a Slack or Email node to notify you of failures
- The error trigger receives details about what went wrong: workflow name, error message, timestamp

**TIP:** Your PDF Organizer workflow already has an Error Trigger built in. It sends failure alerts to Slack's #alerts channel.

# Module 4: Working with Data

## 4.1 Understanding JSON in n8n

Every piece of data in n8n is formatted as JSON (JavaScript Object Notation). Don't let the name scare you -- it's just a way to organize data with labels and values.

```
// This is JSON - like a labeled filing system
{
  "name": "Greg",
  "email": "ugwade8@gmail.com",
  "age": 30,
  "skills": ["n8n", "automation", "AI"],
  "address": {
    "city": "Your City",
    "state": "Your State"
  }
}
```

### JSON Rules:

- **Keys** are always in quotes: "name", "email"
- **Values** can be: text ("hello"), numbers (42), true/false, arrays ([1,2,3]), or nested objects ({...})
- **Comma separated:** Every item except the last needs a comma after it
- **Curly braces {}** wrap objects, **square brackets []** wrap lists/arrays

**KEY CONCEPT:** When a node runs, it outputs JSON. The next node receives that JSON as input. Understanding this data flow is the key to mastering n8n.

## 4.2 Expressions & Variables

Expressions let you use **dynamic values** instead of typing static text. They use the `{{ }}` syntax and can reference data from any previous node.

### Essential Expression Examples:

| Expression                                       | What It Does                       | Example Output      |
|--|------------------------------------|---------------------|
| <code>{{ \$json.name }}</code>                   | Current node's input field 'name'  | Greg                |
| <code>{{ \$json.email }}</code>                  | Current node's input field 'email' | ugwade8@gmail.com   |
| <code>{{ \$('Set Node').item.json.name }}</code> | Field from a specific named node   | Greg                |
| <code>{{ \$now }}</code>                         | Current date/time                  | 2026-03-11T22:00:00 |
| <code>{{ \$now.toISO() }}</code>                 | Current date in ISO format         | 2026-03-11          |
| <code>{{ \$json.name.toUpperCase() }}</code>     | Transform text to uppercase        | GREG                |

| Expression                | What It Does             | Example Output |
|---------------------------|--------------------------|----------------|
| {{ \$json.items.length }} | Count items in an array  | 5              |
| {{ \$json.price * 1.1 }}  | Math operations          | 110            |
| {{ \$execution.id }}      | Unique execution ID      | abc123...      |
| {{ \$workflow.name }}     | Name of current workflow | PDF Organizer  |

### Step 1: Using Expressions

In any field, click the **fx** button (or the gear icon) to switch from "Fixed" to "Expression" mode.

### Step 2: Type your expression

Start with {{ and end with }}. n8n gives you autocomplete suggestions as you type.

### Step 3: Preview the result

You'll see a live preview of what the expression evaluates to, using data from your last test run.

**TIP:** If you see "undefined" as a result, it usually means the field name doesn't exist in the input data. Check spelling and capitalization -- JSON is case-sensitive!

## 4.3 The Set Node (Edit Fields)

The Set node (also called "Edit Fields") is your Swiss Army knife for data manipulation. Use it to create new fields, rename fields, or transform data before passing it to the next node.

### Common Uses:

- **Rename fields:** Change 'first\_name' to 'name'
- **Combine fields:** {{ \$json.first + ' ' + \$json.last }}
- **Extract data:** Pull specific fields from a complex API response
- **Set defaults:** Provide fallback values: {{ \$json.status || 'pending' }}
- **Format dates:** {{ \$now.format('YYYY-MM-DD') }}

## 4.4 The Code Node (JavaScript)

When expressions aren't enough, the Code node lets you write full JavaScript. This is where n8n really shines compared to tools like Zapier.

```
// Example: Process all items and add a category
const items = $input.all();

for (const item of items) {
  const name = item.json.fileName || '';

  if (name.includes('n8n') || name.includes('workflow')) {
    item.json.category = 'N8N_and_Automation';
  } else if (name.includes('API') || name.includes('code')) {
```

```
item.json.category = 'API_and_Development';
} else {
item.json.category = 'Uncategorized';
}
}

return items;
```

### Code Node Essentials:

- **\$input.all()** -- Get all items from the previous node
- **\$input.first()** -- Get just the first item
- **return items** -- Always return the modified items at the end
- **item.json** -- Access the data of each item
- You can use `require()` for Node.js built-in modules like 'crypto', 'path', etc.

**WARNING:** The Code node runs JavaScript, NOT Python. If you know Python, the concepts are similar but the syntax is different. Key difference: use 'const' or 'let' instead of variable assignment, and use '===' for comparison.

## 4.5 Data Mapping Between Nodes

Data mapping is how you connect the output of one node to the input of another. n8n has two ways to do this:

- **Drag-and-drop mapping:** In the input panel, drag a field from the output of the previous node directly into an input field. n8n creates the expression for you.
- **Manual expressions:** Click the fx button and type the expression yourself, referencing `{{ $json.fieldName }}` or `{{ $('Node Name').item.json.fieldName }}`.

**TIP:** Drag-and-drop mapping is the fastest way for beginners. Click on a node, look at the left panel showing "Input" data, and drag fields into the configuration fields on the right.

# Module 5: Logic & Flow Control

## 5.1 IF Node (Conditions)

The IF node is your decision maker. It checks a condition and sends data down one of two paths: **TRUE** (condition met) or **FALSE** (condition not met).

```
Example condition:  
Field: {{ $json.category }}  
Operation: equals  
Value: "Uncategorized"  
  
TRUE path --> Send alert (file couldn't be categorized)  
FALSE path --> Move to category folder (file was categorized)
```

### Available Comparison Operators:

| Operator     | What It Checks          | Example                    |
|--------------|-------------------------|----------------------------|
| equals       | Exact match             | status equals 'active'     |
| not equals   | Not a match             | category not equals 'spam' |
| contains     | Text includes substring | name contains 'pdf'        |
| starts with  | Text begins with        | file starts with 'report_' |
| ends with    | Text ends with          | name ends with '.pdf'      |
| is empty     | Field has no value      | email is empty             |
| is not empty | Field has a value       | phone is not empty         |
| greater than | Number comparison       | price greater than 100     |
| less than    | Number comparison       | count less than 5          |
| regex match  | Pattern matching        | name regex match '[0-9]+'  |

**KEY CONCEPT:** The IF node in your PDF Organizer checks if a file is a duplicate. TRUE = unique (move it), FALSE = duplicate (delete it). This is the core of the dedup pipeline.

## 5.2 Switch Node (Multiple Paths)

The Switch node is like a multi-way IF. Instead of just true/false, it can route data down 3, 4, 5, or more different paths based on a value.

- Use when you need more than 2 outcomes
- Each "rule" defines a condition and output path

- You can add a "fallback" output for items that match no rules

Example: Route support tickets by priority -- "urgent" goes to Slack, "high" goes to email, "normal" goes to Notion, everything else goes to a spreadsheet.

## 5.3 Merge Node (Combine Data)

The Merge node combines data from two different paths back into one. It has several modes:

| Mode               | What It Does                                       | When to Use                           |
|--------------------|--|---------------------------------------|
| Append             | Puts all items together in one list                | Combining results from parallel paths |
| Keep Key Matches   | Joins items where a field matches (like SQL JOINS) | Matching customers with orders        |
| Remove Key Matches | Keeps only items that DON'T match                  | Finding missing records               |
| Multiplex          | Creates every possible combination                 | Testing all permutations              |
| Choose Branch      | Waits for both, outputs only one path              | When you need to sync timing          |

## 5.4 Loop Over Items

By default, n8n processes ALL items through each node automatically. If you have 100 PDFs, the "Move File" node runs 100 times -- once for each PDF. You usually don't need an explicit loop.

But when you DO need to loop (like processing items one at a time with rate limiting), use the **Loop Over Items** node:

- **Batch Size:** How many items to process per loop iteration
- Useful when an API has rate limits (max 10 requests per second)
- Pair with a **Wait** node to add delays between batches

## 5.5 Wait & Pause Nodes

Sometimes you need your workflow to pause before continuing:

- **Wait node:** Pauses for a set amount of time (seconds, minutes, hours)
- **Wait for webhook:** Pauses until an external event happens (approval workflow)
- Use with loops to respect API rate limits

# Module 6: Essential Integrations

## 6.1 Google Drive (Files & Folders)

Google Drive is one of the most important integrations for your workflows. Your PDF Organizer relies on it heavily.

### Available Operations:

| Operation     | What It Does                      | Your Use Case                  |
|---------------|-----------------------------------|--------------------------------|
| List          | Get files/folders from a location | List all PDFs in inbox folder  |
| Get           | Get info about a specific file    | Check file details             |
| Download      | Download file content             | Get PDF for hash generation    |
| Upload        | Upload a new file                 | Save processed documents       |
| Move          | Move file to another folder       | Sort PDF into category folder  |
| Copy          | Make a duplicate of a file        | Create backups                 |
| Delete        | Remove a file                     | Delete duplicate PDFs          |
| Create Folder | Make a new folder                 | Create category folders        |
| Search        | Find files by name/type           | Find existing category folders |

### Step 1: Setup

Add a Google Drive node and select your Google Drive OAuth2 credential

### Step 2: Choose Operation

Select what you want to do (list, move, delete, etc.)

### Step 3: Configure

Set the folder ID, file ID, or other parameters. Use expressions for dynamic values!

**TIP:** Folder IDs are in the Google Drive URL. When you open a folder, the URL looks like:  
drive.google.com/drive/folders/**THIS\_PART\_IS\_THE\_ID**

## 6.2 Google Sheets (Read/Write Data)

Google Sheets acts like a simple database for your workflows. You can read rows, write data, update cells, and more.

- **Read rows:** Pull data from a spreadsheet into your workflow
- **Append row:** Add a new row of data at the bottom

- **Update row:** Change existing data based on a key column
- **Clear sheet:** Remove all data (use carefully!)

**Example: Logging workflow results to a sheet**

```

Spreadsheet: "PDF Processing Log"
Sheet: "Log"

Columns to write:
A: {{ $json.fileName }}
B: {{ $json.category }}
C: {{ $now.format('YYYY-MM-DD HH:mm') }}
D: {{ $json.action }} (MOVED or DELETED)

```

## 6.3 Slack (Messages & Notifications)

Slack integration lets your workflows send messages, creating a notification system for your automations.

- **Send Message:** Post to any channel or DM
- **Use Markdown:** Format messages with *\*bold\**, *\_italic\_*, and links
- **Attachments:** Send files along with messages
- **Reactions:** Add emoji reactions to messages

## 6.4 Notion (Databases & Pages)

Notion integration lets you create and update pages/database entries programmatically.

- **Create Database Page:** Add a new entry to a Notion database
- **Update Database Page:** Modify existing entries
- **Get Database:** Read all entries from a database
- **Create Page:** Create a new Notion page with content

## 6.5 OpenAI / AI Nodes

AI nodes let you add intelligence to your workflows. Your PDF Organizer uses OpenAI to categorize files by reading their names.

**AI Node Types:**

| Node            | Purpose                     | Example                     |
|-----------------|-----------------------------|-----------------------------|
| OpenAI (Chat)   | Send prompts, get responses | Categorize PDF filenames    |
| AI Agent        | Autonomous AI with tools    | Research agent, support bot |
| Text Classifier | Categorize text into labels | Sentiment analysis, routing |

| Node       | Purpose                  | Example              |
|------------|--------------------------|----------------------|
| Summarizer | Condense long text       | Summarize documents  |
| AI Chain   | Multi-step AI processing | Extract then analyze |

**KEY CONCEPT:** When using AI nodes, write clear system prompts. Tell the AI exactly what format you want the response in. Your PDF Organizer prompt says "respond with EXACTLY ONE category name, nothing else" -- this ensures clean, parseable output.

## 6.6 HTTP Request (Any API)

The HTTP Request node is your universal connector. If an app has an API but no dedicated n8n node, you can use HTTP Request to talk to it directly.

- **GET:** Retrieve data from an API
- **POST:** Send data to an API
- **PUT/PATCH:** Update existing data
- **DELETE:** Remove data
- Supports headers, query parameters, body data, and authentication

# Module 7: Credentials & Security

## 7.1 What are Credentials?

Credentials are how n8n logs into other apps on your behalf. Instead of putting your password directly in a workflow, you create a credential once and reference it in any workflow that needs it.

Think of it like giving n8n its own keychain -- it stores all your app logins securely, and workflows just say "use the Google Drive key" without seeing the actual password.

## 7.2 Setting Up OAuth2 (Google)

Google services (Drive, Sheets, Gmail) use OAuth2 -- a secure login flow where you authorize n8n through Google's own login page.

### Step 1: Go to Credentials

Click the key icon in the left sidebar, then "Add Credential".

### Step 2: Search "Google Drive"

Select "Google Drive OAuth2 API".

### Step 3: Click "Sign in with Google"

n8n Cloud makes this easy -- a popup appears asking you to log into your Google account.

### Step 4: Grant permissions

Google asks what n8n can access. Click "Allow" for the permissions needed.

### Step 5: Name it clearly

Name it something like "Google Drive - Greg's ugwade8" so you know which account it uses.

### Step 6: Save

Click Save. You can now use this credential in any workflow!

**WARNING:** If you have multiple Google accounts (ugwade5, 6, 8), create a separate credential for each one and name them clearly. Using the wrong credential is a common source of "file not found" errors.

## 7.3 API Keys (OpenAI, Slack)

Some services use simpler API keys instead of OAuth2. You get a key from the service and paste it into n8n.

**Where to find API keys:**

| Service | Where to Get Key             | n8n Credential Type |
|---------|------------------------------|---------------------|
| OpenAI  | platform.openai.com/api-keys | OpenAI API          |

| Service | Where to Get Key                      | n8n Credential Type |
|---------|---------------------------------------|---------------------|
| Slack   | api.slack.com/apps > Your App > OAuth | Slack API           |
| Notion  | notion.so/my-integrations             | Notion API          |

## 7.4 Managing Multiple Credentials

- Name credentials descriptively: "Google Drive - PDF Organizer" not "Google Drive"
- One credential per account per service
- Review credentials periodically -- delete unused ones
- Test credentials after creation by running a simple workflow node

## 7.5 Security Best Practices

- **Never share workflows with embedded credentials.** When you export a workflow JSON, credential IDs are included but the actual secrets are NOT. The importer needs their own credentials.
- **Use n8n's credential system** -- don't hardcode API keys in Code nodes
- **Rotate keys periodically** -- especially if you suspect a leak
- **Limit permissions** -- only grant the minimum access each credential needs

# Module 8: Error Handling & Debugging

## 8.1 Reading Error Messages

When a node fails, it turns red and shows an error message. Here's how to decode common ones:

| Error Message                       | What It Means                      | How to Fix                       |
|-------------------------------------|------------------------------------|----------------------------------|
| 401 Unauthorized                    | Credential expired or invalid      | Re-authenticate credential       |
| 403 Forbidden                       | No permission to access resource   | Check credential permissions     |
| 404 Not Found                       | File/folder/resource doesn't exist | Check ID or URL is correct       |
| 429 Too Many Requests               | API rate limit hit                 | Add Wait node, slow down         |
| 500 Internal Server Error           | External service has a problem     | Wait and retry later             |
| "Cannot read property of undefined" | Trying to access missing data      | Check field names, add IF checks |
| "No items to process"               | Previous node returned empty       | Check filter, verify data exists |

## 8.2 The Error Trigger Node

Create a dedicated "error handler" workflow that catches failures from your production workflows:

### Step 1: Create new workflow

Name it "Error Handler - Alert"

### Step 2: Add Error Trigger

This fires when any activated workflow fails

### Step 3: Add notification

Connect to Slack/Email to alert you about failures

### Step 4: Activate it

Toggle it ON so it's always listening

## 8.3 Continue on Fail

Some nodes have a "Continue on Fail" setting. When enabled, the workflow keeps running even if that node fails.

- Enable it on non-critical nodes (like optional Slack notifications)
- The node outputs error info instead of stopping the whole workflow

- Your PDF Organizer uses this on Slack and Notion nodes -- if notifications fail, the PDF still gets organized

## 8.4 Try/Catch Patterns

For more sophisticated error handling, use this pattern:

- **Try path:** Your main logic with Continue on Fail enabled
- **IF node after:** Check if the previous node had an error
- **Catch path:** Handle the error (retry, log, alert)

## 8.5 Execution History & Logs

n8n saves a record of every workflow execution. This is your best debugging tool.

### Step 1: View History

Click "Executions" tab at the top of any workflow

### Step 2: Filter

Filter by success/failure, date range

### Step 3: Inspect

Click any execution to see the data at each node -- what went in, what came out

### Step 4: Retry

You can retry failed executions with the original data

**TIP:** When debugging, click on the failed node in the execution history. Look at the INPUT data (left side) -- often the problem is that the previous node didn't produce the data you expected, not that the current node is broken.

# Module 9: Advanced Patterns

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## 9.1 Sub-Workflows

Sub-workflows let you call one workflow from another. This is like creating reusable functions in programming.

- **Parent workflow:** Uses an "Execute Workflow" node to call the sub-workflow
- **Sub-workflow:** Starts with "When Executed by Another Workflow" trigger
- **Pass data:** Send parameters from parent to sub-workflow and get results back

**When to use:** When you have logic that multiple workflows need (like sending formatted Slack messages, or processing a file).

## 9.2 Webhook + Response Patterns

Webhooks can also send data BACK to the caller. This turns n8n into a mini API server.

- Add a "Respond to Webhook" node at the end of your workflow
- Configure the response body, status code, and headers
- The caller receives your response immediately

**Example:** Build a webhook that receives a filename, categorizes it with AI, and returns the category -- all in one API call.

## 9.3 Batch Processing Large Data

When processing hundreds or thousands of items, you need strategies to avoid timeouts and rate limits:

- **Loop Over Items:** Process in batches of 10-50
- **Wait nodes:** Add 1-2 second delays between API calls
- **Pagination:** For APIs that return pages of results, use Loop nodes to fetch all pages
- **Split/Merge:** Split large datasets, process in parallel, then merge results

## 9.4 AI Agent Workflows

AI Agents are the most advanced n8n feature. Unlike simple AI nodes that just answer questions, Agents can use tools, make decisions, and take actions autonomously.

**AI Agent Components:**

| Component     | What It Does                               | Example                                |
|---------------|--|--|
| AI Agent Node | The brain - decides what to do             | Central orchestrator                   |
| Chat Model    | The LLM powering the agent (GPT-4, Claude) | OpenRouter, OpenAI                     |
| Tools         | Actions the agent can take                 | Google Drive, Calculator, HTTP Request |
| Memory        | Conversation history                       | Window Memory, Supabase Vector Store   |
| Embeddings    | Convert text to searchable vectors         | OpenAI Embeddings                      |

Your RAG Pipelines workflow in n8n is an AI Agent workflow -- it uses a chat trigger, AI Agent, OpenRouter model, and Supabase Vector Store for intelligent document retrieval.

## 9.5 Real-World Workflow: Your PDF Organizer

Let's break down the PDF Organizer workflow you built, showing how all the concepts come together:

### The Complete Flow:

#### Step 1: TRIGGER

Google Drive Trigger watches for new PDFs, OR Manual Trigger processes all existing PDFs at once. (Module 3)

#### Step 2: LIST & EXTRACT

List All PDFs node gets files from the watched folder. Extract File Info (Set node) pulls out filename, fileId, and parentFolder. (Module 4)

#### Step 3: AI CATEGORIZE

OpenAI node reads the filename and returns one of 9 category names. Parse Category (Code node) validates the response. (Module 6)

#### Step 4: FOLDER MANAGEMENT

Create Category Folder makes the folder if it doesn't exist. Find Category Folder locates its ID. (Module 6)

#### Step 5: DEDUP CHECK

Download PDF, generate MD5 hash, check if a matching file already exists in the target folder. (Module 4)

#### Step 6: DECISION

IF node: Is it a duplicate? TRUE path = move to folder. FALSE path = delete duplicate. (Module 5)

#### Step 7: NOTIFY

Slack messages for successful moves and duplicate deletions. Notion log for tracking. (Module 6)

#### Step 8: ERROR HANDLING

Error Trigger catches any failures and alerts via Slack #alerts. (Module 8)

**KEY CONCEPT:** This single workflow uses triggers, data extraction, AI, conditions, Google Drive operations, notifications, and error handling -- all 8 modules working together!

# Module 10: Production & Maintenance

## 10.1 Activating Workflows

A workflow isn't "live" until you activate it. The toggle switch in the top right corner controls this.

| State          | What Happens                   | When to Use                  |
|----------------|--------------------------------|------------------------------|
| Inactive (OFF) | Only runs when you click Test  | While building and debugging |
| Active (ON)    | Runs automatically on triggers | When ready for production    |

**WARNING:** Before activating, always test thoroughly! An active workflow with bugs can process real data incorrectly. For your PDF Organizer, test with a few dummy PDFs first before activating it on your real Drive folder.

## 10.2 Import/Export Workflows

You can share and backup workflows as JSON files.

### To Export:

#### Step 1: Open the workflow

Navigate to it in your workflow list

#### Step 2: Click the three-dot menu

Top right of the editor canvas

#### Step 3: Select "Download"

Saves a .json file to your computer

### To Import:

#### Step 1: Option A: Menu Import

Three-dot menu > "Import from File" > select your .json file

#### Step 2: Option B: Paste

Open the .json file, Select All (Cmd+A), Copy (Cmd+C). Then click on the n8n canvas and Paste (Cmd+V). All nodes appear instantly!

#### Step 3: Update Credentials

After import, click each node with a warning icon and select the correct credential from your account

**TIP:** You have 11 workflow JSON files organized in Desktop > 01\_AUTOMATION\_HUB > N8N\_Workflows > PRODUCTION. Each one is ready to import!

## 10.3 Version Control & Backups

- **Export regularly:** Download workflow JSON before making big changes
- **Name versions:** Add dates to backups: PDF\_Organizer\_v2\_2026-03-11.json
- **Store in Google Drive:** Keep backups in your N8N Workflows folder
- **Document changes:** Use sticky notes in the workflow to note what changed and when

## 10.4 Monitoring & Alerts

Keep your workflows healthy with monitoring:

- **Error Handler workflow:** Catches failures and alerts you (you already have this!)
- **Execution History:** Check regularly for failures you might have missed
- **Dashboard Stats:** The n8n home page shows execution counts and failure rates
- **Slack #alerts channel:** Central place for all automation alerts

## 10.5 Scaling & Performance Tips

- **Break large workflows into sub-workflows** -- easier to debug and maintain
- **Use batch processing** for large datasets (50+ items)
- **Cache API responses** when possible to reduce calls
- **Minimize node count** -- combine Set nodes where possible
- **Use Code nodes** for complex transformations instead of 5 separate nodes

## 10.6 Your Automation Roadmap

Here's your suggested learning path from here:

| Phase    | Focus                              | Project                                     |
|----------|------------------------------------|---|
| Week 1-2 | Basics (Modules 1-3)               | Build 3 simple manual workflows             |
| Week 3-4 | Data & Logic (Modules 4-5)         | Build a Google Sheets automation            |
| Week 5-6 | Integrations (Module 6)            | Connect 3+ apps in one workflow             |
| Week 7-8 | Credentials & Error Handling (7-8) | Activate PDF Organizer with all credentials |
| Month 3  | Advanced Patterns (Module 9)       | Build an AI Agent workflow                  |
| Month 4+ | Production (Module 10)             | All workflows active, monitored, backed up  |

**Your Current Workflow Inventory:**

| #  | Workflow                     | Status     | Next Step                           |
|----|------------------------------|------------|-------------------------------------|
| 1  | Automated_Backup_System      | JSON ready | Import + set up Drive credential    |
| 2  | Client_Onboarding            | JSON ready | Import + customize for your clients |
| 3  | Content_Pipeline             | JSON ready | Import + connect Notion             |
| 4  | Daily_Standup_Bot            | JSON ready | Import + connect Slack              |
| 5  | Email_Autoresponder          | JSON ready | Import + connect Gmail              |
| 6  | Invoice_Processor            | JSON ready | Import + customize                  |
| 7  | Lead_Scoring_AI              | JSON ready | Import + connect CRM                |
| 8  | Meeting_Scheduler            | JSON ready | Import + connect Calendar           |
| 9  | Social_Media_Poster          | JSON ready | Import + connect social accounts    |
| 10 | Support_Ticket_Router        | JSON ready | Import + connect helpdesk           |
| 11 | PDF Organizer - Sort & Dedup | JSON ready | Import + connect Drive + OpenAI     |

Congratulations! You now have a complete foundation in n8n workflow automation. Start with Module 2, build your first workflow, and work through each module at your own pace. Every expert was once a beginner -- the key is to build, test, break, fix, and repeat.

# Appendix: Resources & Further Learning

## Official n8n Documentation

| Resource             | URL   | What You'll Learn  |
|----------------------|---|--|
| n8n Docs (Main)      | <a href="https://docs.n8n.io">docs.n8n.io</a>   | Complete reference for all nodes, features, and concepts |
| Learning Path        | <a href="https://docs.n8n.io/learning-path">docs.n8n.io/learning-path</a>                           | Guided path from beginner to advanced                    |
| Try It Out           | <a href="https://docs.n8n.io/try-it-out">docs.n8n.io/try-it-out</a>                                 | Hands-on quick-start tutorials                           |
| Level 1 Course       | <a href="https://docs.n8n.io/courses/level-one">docs.n8n.io/courses/level-one</a>                   | Free structured beginner course with badge reward        |
| AI Workflow Tutorial | <a href="https://docs.n8n.io/advanced-ai/intro-tutorial">docs.n8n.io/advanced-ai/intro-tutorial</a> | Build your first AI agent workflow                       |
| Video Courses        | <a href="https://docs.n8n.io/video-courses">docs.n8n.io/video-courses</a>                           | Official YouTube video tutorials                         |
| Hosting Docs         | <a href="https://docs.n8n.io/hosting">docs.n8n.io/hosting</a>                                       | Self-hosting setup (Docker, environment config)          |

## Free Video Courses (YouTube)

| Course                                       | Duration | Best For                           |
|--|----------|------------------------------------|
| n8n Quick Start - Build Your First Workflow  | 15 min   | Absolute beginners, first workflow |
| Master N8N in 2 Hours (Jono Catliff)         | 2 hours  | Complete beginner-to-pro overview  |
| n8n Crash Course (Data Science with Harshit) | 3 hours  | In-depth beginner tutorial         |
| n8n Beginner Course (Community Series)       | 9 parts  | Step-by-step structured learning   |
| n8n Tutorial 2026: Complete Learning Roadmap | varies   | 2026 updated roadmap by Nate Herk  |

**TIP:** Search YouTube for "n8n tutorial 2026" to find the most up-to-date content. The platform changes fast, so newer tutorials will match your interface.

## Paid Courses

| Platform      | Course  | Details  |
|---------------|---|--|
| Udemy         | N8N for Beginners: Build Automations from Scratch | Self-paced, covers API integration, visual workflows   |
| Udemy         | Top n8n Courses (Updated March 2026)              | Browse <a href="https://www.udemy.com/topic/n8n">udemy.com/topic/n8n</a> for latest options            |
| Class Central | 600+ n8n courses catalog                          | Aggregator of free and paid courses: <a href="https://www.classcentral.com/su">classcentral.com/su</a> |

## Community & Support

| Resource               | URL   | What It Offers  |
|------------------------|---|---|
| n8n Community Forum    | <a href="https://community.n8n.io">community.n8n.io</a>                 | Ask questions, share workflows, get help from other users     |
| n8n Workflow Templates | <a href="https://n8n.io/workflows">n8n.io/workflows</a>                 | 8,500+ ready-made workflow templates to import and learn from |
| n8n GitHub             | <a href="https://github.com/n8n-io/n8n">github.com/n8n-io/n8n</a>       | Source code, bug reports, feature requests                    |
| n8n Learning Hub       | <a href="https://n8nlearninghub.com">n8nlearninghub.com</a>             | Curated tutorials, templates, and community insights          |
| KDnuggets Roadmap      | <a href="https://kdnuggets.com">kdnuggets.com</a> (search: n8n roadmap) | Self-study automation roadmap article                         |

## Recommended Learning Order

Follow this order for the fastest path from zero to productive:

### Step 1: This Training Guide

Read Modules 1-3 of this PDF first to understand the fundamentals.

### Step 2: n8n Quick Start Video

Watch the 15-minute official quick start on YouTube to see the interface in action.

### Step 3: Level 1 Course

Complete the free Level 1 course at [docs.n8n.io/courses/level-one](https://docs.n8n.io/courses/level-one) for hands-on practice.

### Step 4: Build Your PDF Organizer

Import your PDF\_Organizer.json and set up the credentials (Module 7 of this guide).

### Step 5: Browse Templates

Explore [n8n.io/workflows](https://n8n.io/workflows) for inspiration. Import templates, study how they work, then modify them.

### Step 6: Join the Community

Sign up at [community.n8n.io](https://community.n8n.io). When you get stuck, search the forum first -- most questions have already been answered.

### Step 7: AI Workflows

Once comfortable, follow the AI tutorial at [docs.n8n.io/advanced-ai/intro-tutorial](https://docs.n8n.io/advanced-ai/intro-tutorial) to build smart workflows.

**KEY CONCEPT:** The single best way to learn n8n is by BUILDING. Don't just read -- open your n8n instance at [communityplace.app.n8n.cloud](https://communityplace.app.n8n.cloud) and follow along with each module. Break things, fix things, and experiment!

## Quick Reference: All Links

Bookmark these links in your browser:

- **Your n8n Instance:** [communityplace.app.n8n.cloud](https://communityplace.app.n8n.cloud)
  - **n8n Docs:** [docs.n8n.io](https://docs.n8n.io)
  - **Level 1 Course:** [docs.n8n.io/courses/level-one](https://docs.n8n.io/courses/level-one)
  - **AI Tutorial:** [docs.n8n.io/advanced-ai/intro-tutorial](https://docs.n8n.io/advanced-ai/intro-tutorial)
  - **Workflow Templates:** [n8n.io/workflows](https://n8n.io/workflows)
  - **Community Forum:** [community.n8n.io](https://community.n8n.io)
  - **Video Courses:** [docs.n8n.io/video-courses](https://docs.n8n.io/video-courses)
  - **Learning Hub:** [n8nlearninghub.com](https://n8nlearninghub.com)
  - **Udemy Courses:** [udemy.com/topic/n8n](https://udemy.com/topic/n8n)
  - **GitHub:** [github.com/n8n-io/n8n](https://github.com/n8n-io/n8n)
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Congratulations! You now have a complete foundation in n8n workflow automation. Start with Module 2, build your first workflow, and work through each module at your own pace. Every expert was once a beginner -- the key is to build, test, break, fix, and repeat.

## End of Training Guide