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Working with JSON in Delphi

A seven-part course on JSON for Delphi developers — from what JSON actually is, through dates, the RTL's three JSON APIs, and serialization, to putting binary data and real images into JSON with base64, and finally generating Delphi classes straight from a JSON document. Runnable Delphi code, and the mental models that make it all obvious.

By Dr. Holger Flick

Almost everything your Delphi app says to the outside world, it says in JSON. The REST call to a payment provider, the config file it reads on startup, the webhook from GitHub, the reply from a weather service or an LLM — all of it arrives as the same little text format with curly braces and square brackets that you've typed a thousand times. Most of us learned it by osmosis: enough to get the field out, never quite enough to be sure what the format actually promises.

This tutorial is the course that fixes that, delivered as a seven-part article series. It starts before the code — with what JSON *is* and the two types it deliberately doesn't have — and only then reaches for Pascal, so that when the code arrives it looks inevitable rather than magical. Along the way it clears up the things that quietly cost real afternoons: why the RTL ships *three* different JSON APIs, why serialization breaks in ways that trace back to a single false assumption, and what base64 actually does to your bytes.

Read the parts in order — each one starts exactly where the previous one ended, and the later code leans on the earlier mental models.

Part 1 — What JSON actually is

You're Already Surrounded by JSON — Here's What It Actually Is

Before a single line of Pascal: what JSON really is, why the whole industry landed on it, why it keeps being called "the thing that replaced XML," and the surprisingly small set of rules its entire data model is built from. By the end you can look at any JSON document, however deeply nested, and see the handful of pieces it's assembled from — the mental model every library in this series is built to manipulate.

Part 2 — The type JSON doesn't have: dates and times

The Date Type JSON Doesn't Have

In Delphi a date is a real type the compiler and debugger understand. Serialize one to JSON and all of that evaporates — because JSON's six value types don't include a date, so a date in JSON isn't a type at all, it's a *convention* both ends have to agree on out of band. This part covers the two conventions the world actually uses, what each one costs, and how to produce and consume them correctly with `System.DateUtils` — before the wrong choice dates someone's invoice a day early or jumps your timestamps to 2033.

Part 3 — One RTL, three ways to speak JSON

One RTL, Three Ways to Speak JSON

Now the code — and a fact that surprises experienced Delphi developers: the RTL doesn't give you *one* JSON API, it gives you **three**, in different units, with genuinely different strengths, and most people only ever meet the first. That's fine right up until a 300 MB export takes the process down with it. This part walks through all three, tells you which to reach for, and untangles the second, completely separate JSON world called `REST.Json` sitting in your `uses` clause — where it came from and how to tell the two apart at a glance.

Part 4 — Serialization: turning objects into JSON

Objects Aren't Data — Serialization Is How They Pretend

Building JSON field-by-field is honest for small payloads and miserable for a class with twelve fields. The wish — *just turn my object into JSON* — has a name, serialization, and Delphi can do it. But this part spends real time on what the word means first, because the wish hides an assumption that isn't true: that an object *is* data.

It isn't — it's data plus identity plus behavior plus references plus, often, a handle to something that only exists while your process runs. Almost every serialization bug traces back to that confusion, and this is where you learn to see it coming.

Part 5 — Binary data and base64, explained

Base64: The Thing Everyone Uses and Nobody Explains

The second type JSON doesn't have, and the harder one: binary data. A JPEG, a PDF, a certificate — none of them is a string, a number, a boolean, or null, and no convention turns a JPEG into a number. The industry's answer is base64, and most developers who use it correctly can't tell you what it does — "it compresses it," "it encrypts it," both wrong, the second dangerous. No Delphi code here: this part is the explanation of what binary data is, why JSON genuinely can't carry it, and what base64 does to your bytes at the bit level — so the code in Part 6 is obvious.

Part 6 — From TBitmap to JSON and back again

From TBitmap to JSON and Back Again

The payoff, in working code. Encoding and decoding with `TNetEncoding`, one genuine RTL trap that silently produces JSON your consumers may reject, and complete round trips with real images — `TBitmap` and `TJPEGImage` — using nothing outside the RTL and VCL. By the end you can put a picture into a JSON document and get the same picture back out, and know exactly which steps can lose data and which can't.

Part 7 — Let a tool write the classes for you

JSON to Delphi Classes: The Popular Version Isn't the Live One

Once you know how the RTL speaks JSON, the obvious next question is why you should type the DTO classes at all — and there is a free tool that generates them: paste a JSON document, get a compilable unit with the classes, the `REST.Json` attributes and the serialization wiring already in place. You will recognize almost every line of its output from Parts 3 and 4, including the two quiet workarounds it builds in for you. But this part opens with the small grey line under the repository name that changed the story: the version everyone finds is not the version anyone is maintaining, and the thirty seconds of reading that tells the two apart is a skill worth more than the tool itself.

What you'll be able to do afterwards

Work through all seven parts and JSON stops being a format you copy incantations for and becomes one you actually understand:

- **Read any JSON document** and name every piece it's built from.
- **Move dates across the wire** without shifting anyone's day or decade.
- **Pick the right RTL JSON API** for the job — and know why `REST.Json` is a different world.
- **Serialize objects safely**, seeing which parts of an object were ever really data.
- **Explain base64** — what it does, what it costs, and what it does *not* protect.
- **Round-trip real images** through JSON with confidence about where data can be lost.
- **Generate your DTO classes from a sample document** — and judge, before you depend on it, whether the project behind the tool is still alive.

> JSON is a small format with a few sharp edges. Learn the edges once, and every API you talk to for the rest of your career gets easier.

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