

When to Choose REST or SOAP Web Services

SOAP (Simple Object Access Protocol) and REST (Representational State Transfer) are both established approaches to accessing web services. REST was created more recently in response to shortcomings with SOAP and seeks to provide simpler access to web services. While REST is more commonly used today, there are some cases where SOAP is a better choice.

Key Differences

The following table describes key differences between SOAP and REST:

	SOAP	REST
Basic Functionality	SOAP is a protocol that uses service interfaces to expose its functionality to client applications	REST is a set of architectural principles based on URIs and a stateless communications protocol, most commonly, HTTP
Performance and Bandwidth Usage	Requires more bandwidth than REST, generally slower	Requires less bandwidth than SOAP, generally faster
Format Compatibility	Only works with XML formats	Works with plain text, XML, HTML, and JSON
Web Service Compatibility	Cannot directly call RESTful APIs due to differences in protocol and architecture	Can communicate with SOAP-based services over HTTP, but does not use the SOAP protocol
Error Handling	Built-in error handling and response	Relies on standard HTTP status codes for error handling (like 404, 500) but lacks a standardized messaging framework
Security	Data sent over SOAP is end-to-end encrypted using SSL and WS-Security	Supports HTTPS and SSL; typically uses OAuth, API keys, or JWT for authentication and authorization
Caching and Versioning	Supports versioning through WSDL but doesn't support caching	Supports caching through HTTP but doesn't have built-in versioning

When to Choose REST

- **Performance and Speed:** Choose REST for better performance and faster speed. SOAP, in comparison, has a heavier payload and requires more bandwidth. REST is known for excellent performance and easier scalability.
- **Simplicity:** Coupled with JSON and HTTP protocols, REST is generally easier to work with. It utilizes easy-to-understand standards, resulting in a smaller learning curve.
- **REST is optimized for the web:** When using JSON as its data format, REST offers better support for browser clients. REST is also closely aligned in design philosophy with other web technologies.

When to Choose SOAP

- **Higher Security:** In addition to SSL support, WS-Security is a built-in standard in SOAP, providing it with more enterprise-level security features. If confidential data is being passed between the client and the server, SOAP is a great choice.
- **ACID Compliance:** SOAP has built-in ACID compliance (Atomicity, Consistency, Isolation, Durability). ACID compliance reduces anomalies and protects the integrity of a database by specifying how transactions can interact with the database. ACID is typically favored when handling financial or otherwise sensitive transactions.
- **Reliable Messaging:** REST doesn't have a standard messaging system and can only address communication failures by retrying. SOAP has successful/retry logic built in and provides end-to-end reliability, even through SOAP intermediaries. SOAP is often a good choice for things like messaging systems. SOAP also uses WSDL (Web Services Description Language) to define service contracts, making integration easier in strongly typed environments like Java or .NET.