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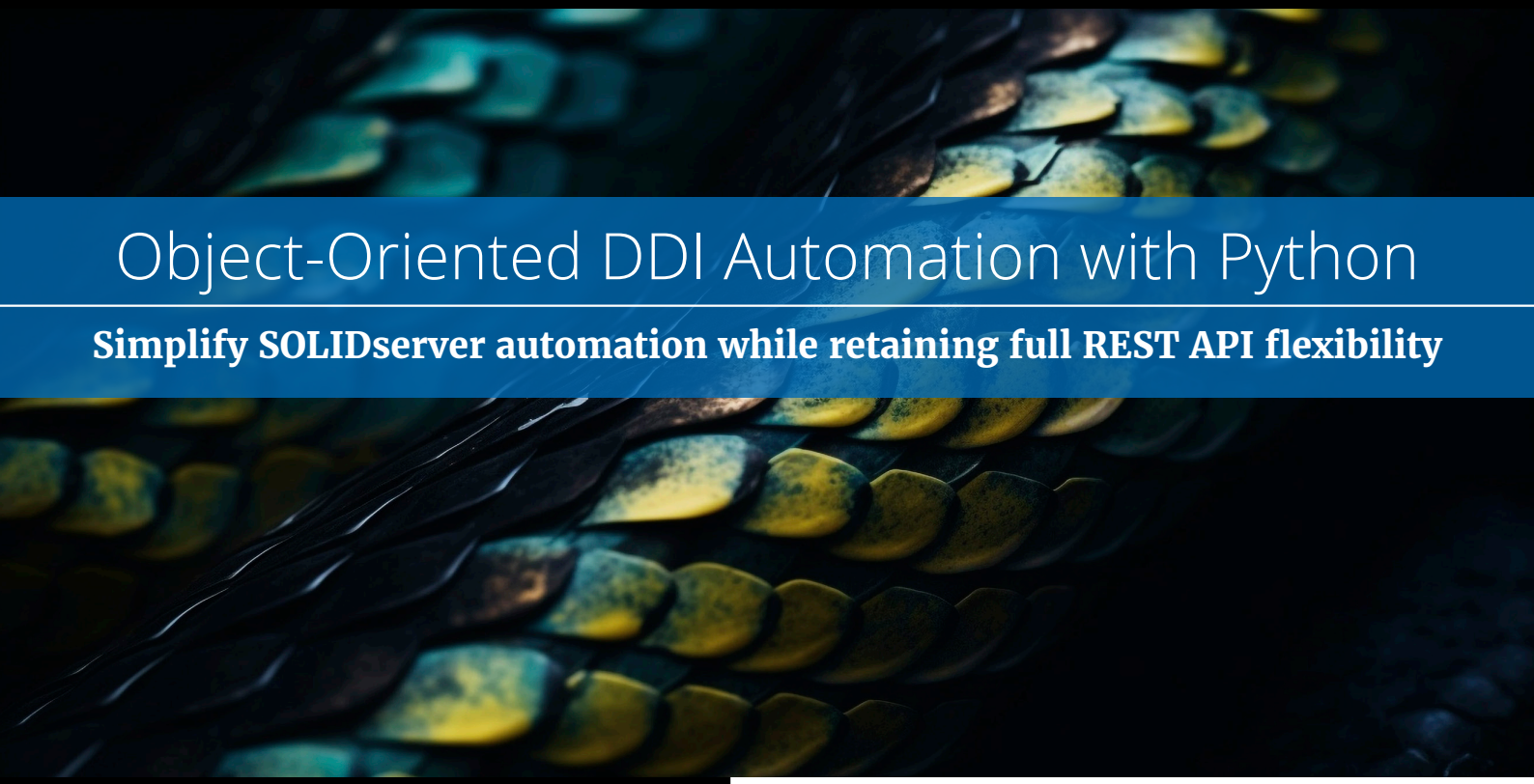
Solution Note



Object-Oriented DDI Automation with Python

Simplify SOLIDserver automation while retaining full REST API flexibility

Executive Summary

Direct REST API calls give automation teams broad access to SOLIDserver, but they also require developers to manage service-specific methods, parameters, identifiers, responses, and relationships between DDI resources in application code.

`SOLIDserverRest.adv` adds an object-oriented Python model for resources such as IPAM spaces and networks. The same authenticated session also retains generic API access for concise or specialized operations. This hybrid approach lets developers use DDI objects where context and lifecycle matter, while preserving the complete API reach required for DNS, reporting, verification, and other focused service calls.

The Challenge

As Infrastructure as Code (IaC) and dynamic application delivery become more widespread, organizations increasingly need to automate network and DDI operations. Python provides a practical and accessible starting point for integrating DDI services into infrastructure workflows.

A typical infrastructure workflow may need to identify the correct IPAM space, select an approved parent network, find available subnet capacity, create a subnet in the right hierarchy, identify a free host-address candidate, publish a DNS record, and verify the result.

Implementing every step through direct API calls is possible, but the script must handle method-specific parameters, object identifiers, hierarchy, response normalization, error handling, and data exchange between stages. This can make automation harder to read, reuse, and maintain.

At the same time, an object model should not restrict access to specialized API functions. Automation teams need a practical way to choose the most appropriate abstraction for each operation without changing clients or building parallel integrations.

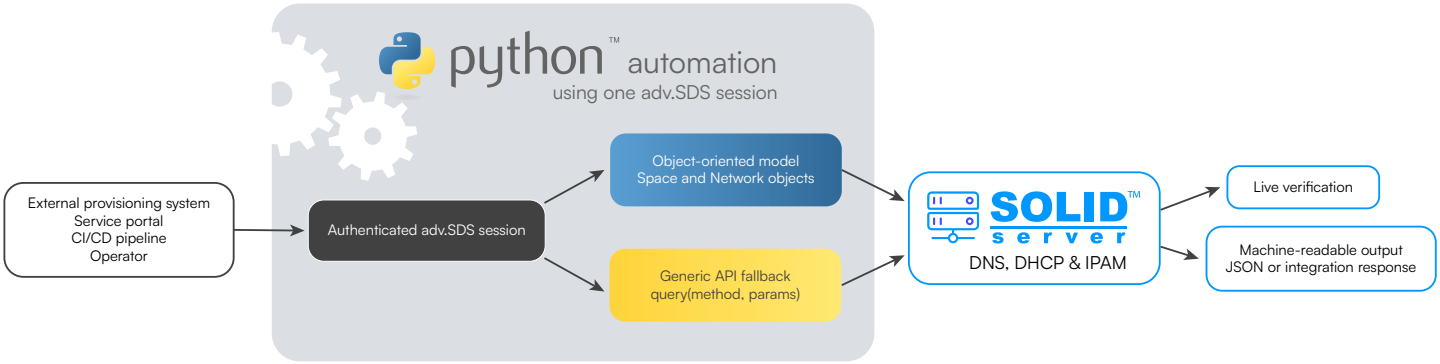
Solution Overview

`SOLIDserverRest` provides the basic Python mapping to the SOLIDserver REST API, while `SOLIDserverRest.adv` builds an object-oriented DDI model on top of it. The advanced interface is the recommended approach for resources and operations represented by the object model, while retaining access to the underlying `SOLIDserverRest` API mapping for operations that are better handled as direct service calls.

Through one authenticated `adv.SDS` session, `SOLIDserverRest.adv` therefore provides two complementary access patterns:

- **Object-oriented DDI operations:** Classes such as `Space` and `Network` represent resources, refresh their state, express relationships, and perform lifecycle operations.
- **Generic API queries through `SOLIDserverRest`:** `query(method, params)` provides direct access to list, information, reporting, DNS, and specialized service-method calls through the underlying REST API mapping.

Both patterns allow automation to move between object-oriented operations and direct API queries without creating a separate client or authentication context.



Example solution flow for object-oriented DDI automation with Python

Object-Oriented DDI Operations

The advanced model makes the DDI intent visible in Python code. The following example represents a parent network and asks SOLIDserver to find available child subnets:

```
space = sdsadv.Space(sds=sds, name=space_name)
space.refresh()

parent = sdsadv.Network(sds=sds, space=space)
parent.set_address_prefix(block_address, block_prefix)
parent.refresh()

candidates = parent.find_free(
    prefix=requested_prefix,
    max_find=limit,
)
```

A selected subnet can then be linked to the parent, created, refreshed, and queried for free host-address candidates:

```
subnet = sdsadv.Network(sds=sds, space=space, name=subnet_name)
subnet.set_address_prefix(subnet_address, subnet_prefix)
subnet.set_parent(parent)
subnet.set_is_terminal(True)
subnet.create()
subnet.refresh()

free_addresses = subnet.find_free_ip(max_find=limit)
```

The code mirrors the DDI model: a network belongs to a space, has a parent, can be created, and can be queried for free capacity.

Generic API Queries through SOLIDserverRest

Some operations are clearer as direct API calls or are not represented by an object in the advanced model. In these cases, the `adv.SDS` session exposes the underlying `SOLIDserverRest` API mapping through `query(method, params)`.

For example, after selecting a zone, fully qualified domain name, and address, the workflow can create an A record through the same advanced session:

```
client.query(
    "dns_rr_create",
    params=record_parameters,
)
```

The same mechanism can be used for lightweight inventory, reporting, verification, and other specialized service calls. Developers therefore retain direct access to the broader SOLIDserver REST API while continuing to use the same `adv.SDS` session.

USE CASE

Solution Use Case: Policy-Controlled Network and DNS Provisioning

A service portal, cloud provisioning platform, CI/CD pipeline, workflow engine, custom application, or operator can initiate a request for network and DNS resources. Python automation then translates that request into controlled DDI operations through one authenticated `adv.SDS` session.

A typical workflow includes the following stages:

1. **Validate the request and resolve its context:** Confirm the requested prefix, naming information, metadata, and applicable allocation policy. Resolve the appropriate IPAM space and identify the networks in which the request is allowed to operate.
2. **Identify available capacity:** Use `Space` and `Network` objects to inspect the current SOLIDserver state and return suitable free-subnet or host-address candidates.
3. **Select and create the required resources:** Apply organizational selection rules, create the selected subnet in the correct hierarchy, refresh its state, and capture the resulting object identifiers and metadata.

USE CASE

4. **Coordinate address and DNS handling:** Depending on the use case, create or reserve a selected address in IPAM, pass it to another provisioning system responsible for the address lifecycle, or use it as input for an associated DNS operation. Focused DNS actions can be performed through the underlying `SOLIDserverRest` API mapping on the same authenticated session.

5. **Verify the resulting state:** Read the created or updated resources back from SOLIDserver rather than relying only on the response from the write operation. Verification can include the network hierarchy, address state, DNS records, audit information, and other relevant metadata.

6. **Return a structured result:** Provide the initiating system with machine-readable output containing the selected context, created resources, resulting identifiers, verification status, and any information required by subsequent workflow stages.

Inputs and outputs can be exchanged as JSON documents, API payloads, workflow variables, event messages, or native objects from the surrounding automation platform. This allows SOLIDserver automation to participate in wider provisioning and deprovisioning processes without requiring manual interaction.

`find_free()` and `find_free_ip()` can return multiple candidate subnets or addresses. A workflow may select a candidate according to capacity, location, naming, utilization, or other organizational policies. Random selection from the returned list can reduce the probability that concurrent workflows choose the same candidate, but it does not eliminate the race between discovery and creation. Where strict concurrency control is required, create or reserve the selected resource immediately where applicable, detect conflicts, and retry with another candidate..

Production implementations can also separate planning from execution through preview or dry-run behavior, approval gates, explicit commit actions, and post-change validation. These controls are implementation choices rather than requirements of the Python library itself.

The same pattern is not limited to subnet and DNS provisioning. It can be extended to address allocation, pools, DHCP scopes, resource metadata, DNS record lifecycle management, reporting, reconciliation, and deprovisioning.

Solution Benefits

Simplify DDI automation development
with Python objects for resources, relationships, and lifecycle operations.

Improve readability and maintainability
by expressing the intended DDI operation directly in code.

Retain complete API flexibility
for focused or specialized SOLIDserver service calls.

Accelerate ecosystem integration
through simple JSON hand-offs with portals, pipelines, workflow engines, and cloud platforms.

Reduce change risk
with dry-run behavior, explicit write execution, and live post-change verification.

Strengthen auditability
by capturing selected context, creating object identifiers, trace information, and verification results.

Key Components

- **SOLIDserver DDI:** Unified DNS, DHCP, and IP address management with REST API access for external automation.
- **SOLIDserverRest:** Basic Python mapping for direct SOLIDserver REST API operations.
- **SOLIDserverRest.adv:** Recommended object-oriented interface for key DDI resources, built on `SOLIDserverRest` and retaining generic API access through the same session.
- **Python automation or orchestration platform:** A standalone script, service portal, CI/CD pipeline, provisioning system, workflow engine, or custom NetOps application.

Production Considerations

Use a dedicated least-privilege API identity, validate the SOLIDserver TLS certificate, protect credentials outside source code, and apply appropriate planning or approval controls before write execution. Also account for concurrency, repeated requests, partial failures, and reconciliation.

`find_free()` and `find_free_ip()` can return multiple candidate subnets or addresses. Selecting one randomly from the returned list reduces the probability that parallel workflows choose the same candidate, but does not eliminate the race between discovery and creation. Where strict concurrency control is required, create or reserve the selected resource immediately where applicable, detect conflicts, and retry with another candidate.

Conclusion

`SOLIDserverRest.adv` makes SOLIDserver automation more expressive without sacrificing REST API coverage. The recommended object-oriented interface is well suited to stateful operations where DDI context, relationships, and lifecycle matter, while direct queries through the underlying `SOLIDserverRest` mapping remain available for concise, specialized, or otherwise unsupported operations.

By combining both access patterns through the same authenticated session, organizations can build readable and reusable Python workflows for subnet provisioning, DNS registration, verification, and wider ecosystem integration while keeping SOLIDserver at the center of controlled DDI operations.

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