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# Chapter 1. Relationship hydration with `expand(path)`

This section documents the new relationship traversal and hydration capability added to the BIAPI query language. It preserves backward compatibility and introduces no SQL-like syntax.

## 1.1. What is `expand(path)`?

Use `expand(path)` to hydrate properties that are modeled as `EntityReference` or ontology-annotated relations. The path is dot-based and may include array wildcards `[*]` between segments.

- Single reference: `expand(customer)`
- Array of references: `expand(items[*].product)`
- Nested arrays: `expand(patient.visits[l].diagnoses[l])`

Expansion is a query-time operation: the related document(s) are materialized and embedded at the specified path in the result.

## 1.2. Filtering related entities (inline)

Continue to use your existing filter primitives in the same query string to filter the root collection. Filtering on related entities will be supported via either:

- Inline path blocks: `path { key:value, key2:^[v1,v2] }`
- Or filters inside `expand(...)`: `expand(customer, status:active)`

Note: In v1, parsing of `expand(path)` is enabled; related-entity filters inside `expand` and inline path blocks will be introduced with the planner/compiler work.

## 1.3. Projection with `fields:[+/-]`

A unified projection syntax can be used both at the root and per expansion.

- Inclusion mode: `fields:[+_id,+total,+customer.name]`
- Exclusion mode: `fields:[-internalNotes,-secret]`
- Inside `expand`: `expand(customer, fields:[+name,+tier,-ssn])`

Rules: - If any `+` appears → include only those paths, then apply `-` as carve-outs. - If only `-` appears → include all by default and remove listed paths. - `_id` keeps current default behavior unless explicitly set.

## 1.4. Examples

- Hydrate a single reference and keep a few fields

```
q = "realm:acme && expand(customer, fields:[+name,+tier]) &&
fields:[+_id,+total,+customer.name]"
```

- Hydrate array of product references inside line items, filter to active products, project a couple of fields

```
q = "expand(items[*].product, active:true, fields:[+sku,+title]) &&
fields:[+_id,+items.product.sku]"
```

- Filter by a related product without projecting it (inline block form)

```
q = "items[*].product{ active:true, sku:^[A123,B456] } && fields:[+_id,+total]"
```

## 1.5. Semantics and limits

- Backward compatible: if no `expand(...)` or related-path filters are present, queries run as they do today (single-collection).
- Depth for nested paths is bounded; on mixed array/object hops, traversal stops at the first non-reference boundary.
- Unknown projection paths are hard errors (the request fails with a clear message).

See also: [Planner and QueryGateway](#)