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Pagination



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The Model Context Protocol (MCP) supports paginating list operations that may return large result sets. Pagination allows servers to yield results in smaller chunks rather than all at once.

Pagination is especially important when connecting to external services over the internet, but also useful for local integrations to avoid performance issues with large data sets.

Pagination Model

Pagination in MCP uses an opaque cursor-based approach, instead of numbered pages.

- The **cursor** is an opaque string token, representing a position in the result set
- **Page size** is determined by the server, and **MAY NOT** be fixed

Response Format

Pagination starts when the server sends a **response** that includes:

- The current page of results
- An optional `nextCursor` field if more results exist

```
{
  "jsonrpc": "2.0",
  "id": "123",
  "result": {
    "resources": [...],
    "nextCursor": "eyJwYWdlIjogM30="
```

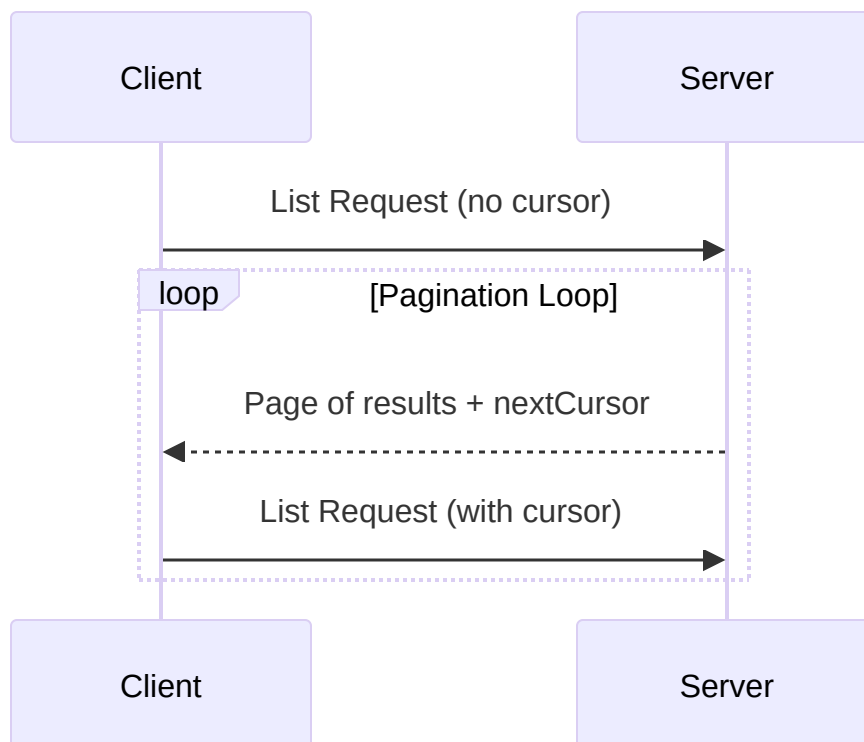
```
}  
}
```

Request Format

After receiving a cursor, the client can *continue* paginating by issuing a request including that cursor:

```
{  
  "jsonrpc": "2.0",  
  "method": "resources/list",  
  "params": {  
    "cursor": "eyJwYWdlIjogMn0="
```

Pagination Flow



Operations Supporting Pagination

The following MCP operations support pagination:

- `resources/list` - List available resources
- `resources/templates/list` - List resource templates
- `prompts/list` - List available prompts
- `tools/list` - List available tools

Implementation Guidelines

1. Servers **SHOULD**:

- Provide stable cursors
- Handle invalid cursors gracefully

2. Clients **SHOULD**:

- Treat a missing `nextCursor` as the end of results
- Support both paginated and non-paginated flows

3. Clients **MUST** treat cursors as opaque tokens:

- Don't make assumptions about cursor format
- Don't attempt to parse or modify cursors
- Don't persist cursors across sessions

Error Handling

Invalid cursors **SHOULD** result in an error with code -32602 (Invalid params).

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