Package 'azr'

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Title Credential Chain for Seamless 'OAuth 2.0' Authentication to 'Azure Services'

Version 0.2.1

Description Implements a credential chain for 'Azure OAuth 2.0' authentication based on the package 'httr2"s 'OAuth' framework. Sequentially attempts authentication methods until one succeeds. During development allows interactive browser-based flows ('Device Code' and 'Auth Code' flows) and non-interactive flow ('Client Secret') in batch mode.

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Contents

`api_client` *Azure API Client*

Description

An R6 class that provides a base HTTP client for interacting with Azure APIs. This client handles authentication, request building, retry logic, logging, and error handling for Azure API requests.

Details

The `api_client` class is designed to be a base class for Azure service-specific clients. It provides:

- Automatic authentication using Azure credentials
- Configurable retry logic with exponential backoff
- Request and response logging
- JSON, XML, and HTML content type handling
- Standardized error handling

Public fields

`.host_url` Base URL for the API

`.base_req` Base httr2 request object

`.provider` Credential provider R6 object

`.credentials` Credentials function for authentication

`.options` Request options (timeout, connecttimeout, max_tries)

`.response_handler` Optional callback function to process response content

Methods

Public methods:

- `api_client$new()`
- `api_client$.fetch()`
- `api_client$.req_build()`
- `api_client$.req_perform()`
- `api_client$.resp_content()`
- `api_client$.get_token()`
- `api_client$clone()`

Method `new()`**:** Create a new API client instance

Usage:

```
api_client$new(
  host_url,
  provider = NULL,
  credentials = NULL,
  timeout = 60L,
  connecttimeout = 30L,
  max_tries = 5L,
  response_handler = NULL
)
```

Arguments:

`host_url` A character string specifying the base URL for the API (e.g., `"https://management.azure.com"`).

`provider` An R6 credential provider object that inherits from the `Credential` or `DefaultCredential` class. If provided, the credential's `req_auth` method will be used for authentication. Takes precedence over `credentials`.

`credentials` A function that adds authentication to requests. If both `provider` and `credentials` are `NULL`, uses `default_non_auth()`. The function should accept an httr2 request object and return a modified request with authentication.

`timeout` An integer specifying the request timeout in seconds. Defaults to `60`.

`connecttimeout` An integer specifying the connection timeout in seconds. Defaults to `30`.

`max_tries` An integer specifying the maximum number of retry attempts for failed requests. Defaults to `5`.

`response_handler` An optional function to process the parsed response content. The function should accept one argument (the parsed response) and return the processed content. If `NULL`, uses `default_response_handler()` which converts data frames to data.table objects. Defaults to `NULL`.

Returns: A new `api_client` object

Method `.fetch()`**:** Make an HTTP request to the API

Usage:

```
api_client$.fetch(
  path,
  ...,
  req_data = NULL,
  req_method = "get",
  verbosity = 0L,
  content = c("body", "headers", "response", "request"),
  content_type = NULL
)
```

Arguments:

`path` A character string specifying the API endpoint path. Supports `glue::glue()` syntax for variable interpolation using named arguments passed via `...`.

`...` Named arguments used for path interpolation with `glue::glue()`.

`req_data` Request data. For GET requests, this is used as query parameters. For other methods, this is sent as JSON in the request body. Can be a list or character string (JSON).

`req_method` A character string specifying the HTTP method. One of `"get"`, `"post"`, `"put"`, `"patch"`, or `"delete"`. Defaults to `"get"`.

`verbosity` An integer specifying the verbosity level for request debugging (passed to `httr2::req_perform()`). Defaults to `0`.

`content` A character string specifying what to return. One of:

- `"body"` (default): Return the parsed response body
- `"headers"`: Return response headers
- `"response"`: Return the full httr2 response object
- `"request"`: Return the prepared request object without executing it

`content_type` A character string specifying how to parse the response body. If `NULL`, uses the response's Content-Type header. Common values: `"application/json"`, `"application/xml"`, `"text/html"`.

Returns: Depends on the `content` parameter:

- `"body"`: Parsed response body (list, data.frame, or character)
- `"headers"`: List of response headers
- `"response"`: Full `httr2::response()` object
- `"request"`: `httr2::request()` object

Method `.req_build()`**:** Build an HTTP request object

Usage:

```
api_client$.req_build(path, ..., req_data = NULL, req_method = "get")
```

Arguments:

`path` A character string specifying the API endpoint path. Supports `glue::glue()` syntax for variable interpolation using named arguments passed via `...`.

`...` Named arguments used for path interpolation with `glue::glue()`.

`req_data` Request data. For GET requests, this is used as query parameters. For other methods, this is sent as JSON in the request body. Can be a list or character string (JSON).

`req_method` A character string specifying the HTTP method. One of `"get"`, `"post"`, `"put"`, `"patch"`, or `"delete"`. Defaults to `"get"`.

Returns: An `httr2::request()` object ready for execution

Method `.req_perform()`**:** Perform an HTTP request and log the results

Usage:

```
api_client$.req_perform(req, verbosity)
```

Arguments:

`req` An `httr2::request()` object to execute

`verbosity` An integer specifying the verbosity level for request debugging (passed to `httr2::req_perform()`). Defaults to `0`.

Returns: An `httr2::response()` object containing the API response

Method `.resp_content()`**:** Extract and parse response content

Usage:

```
api_client$.resp_content(resp, content_type = NULL)
```

Arguments:

`resp` An `httr2::response()` object

`content_type` A character string specifying how to parse the response body. If `NULL`, uses the response's Content-Type header. Common values: `"application/json"`, `"application/xml"`, `"text/html"`.

Returns: Parsed response body. Format depends on content type:

- JSON: List or data.frame
- XML: xml2 document
- HTML: xml2 document
- Other: Character string

Method `.get_token()`**:** Get authentication token from the credential provider

Usage:

```
api_client$.get_token()
```

Returns: An `httr2::oauth_token()` object if a provider is available, otherwise returns `NULL` with a warning.

Method `clone()`**:** The objects of this class are cloneable with this method.

Usage:

```
api_client$clone(deep = FALSE)
```

Arguments:

`deep` Whether to make a deep clone.

Examples

```
## Not run:
# Create a client with default credentials
client <- api_client$new(
  host_url = "https://management.azure.com"
)

# Create a client with a credential provider
cred_provider <- get_credential_provider(
  scope = "https://management.azure.com/.default"
)
client <- api_client$new(
  host_url = "https://management.azure.com",
  provider = cred_provider
)

# Create a client with custom credentials function
client <- api_client$new(
  host_url = "https://management.azure.com",
  credentials = my_credential_function,
  timeout = 120,
  max_tries = 3
)

# Create a client with custom response handler
custom_handler <- function(content) {
  # Custom processing logic - e.g., keep data frames as-is
  content
}
client <- api_client$new(
  host_url = "https://management.azure.com",
  response_handler = custom_handler
)

# Make a GET request
response <- client$.fetch(
  path = "/subscriptions/{subscription_id}/resourceGroups",
  subscription_id = "my-subscription-id",
  req_method = "get"
)

## End(Not run)
```

`api_resource` *Azure API Resource*

Description

An R6 class that wraps an `api_client` and adds an additional path segment (like "beta" or "v1.0") to all requests. This is useful for APIs that version their endpoints or have different API surfaces under different paths.

Details

The api_resource class creates a modified base request by appending an endpoint path to the client's base request. All subsequent API calls through this resource will automatically include this path prefix.

Public fields

.client The cloned api_client instance with modified base_req

Methods

Public methods:

- api_resource$new()
- api_resource$clone()

Method new(): Create a new API resource instance

Usage:

```
api_resource$new(client, endpoint)
```

Arguments:

client An api_client object that provides the base HTTP client functionality. This will be cloned to avoid modifying the original.

endpoint A character string specifying the API endpoint or path segment to append (e.g., "v1.0", "beta").

Returns: A new api_resource object

Method clone(): The objects of this class are cloneable with this method.

Usage:

```
api_resource$clone(deep = FALSE)
```

Arguments:

deep Whether to make a deep clone.

Examples

```
## Not run:
# Create a client
client <- api_client$new(
  host_url = "https://graph.microsoft.com"
)

# Create a resource with v1.0 API endpoint
resource_v1 <- api_resource$new(
  client = client,
  endpoint = "v1.0"
)

# Create a resource with beta API endpoint
resource_beta <- api_resource$new(
```

```
  client = client,
  endpoint = "beta"
)

# Make requests - the endpoint is automatically prepended
response <- resource_v1$.fetch(
  path = "/me",
  req_method = "get"
)

## End(Not run)
```

`api_service` *API Service Base Class*

Description

Base R6 class for creating API service wrappers. This class provides a foundation for building service-specific API clients with authentication, endpoint management, and configuration.

Public fields

`.client` An api_client instance for making API requests

Methods

Public methods:

- `api_service$new()`

Method `new()`**:** Create a new API service instance

Usage:

```
api_service$new(
  client = NULL,
  chain = NULL,
  endpoints = list(),
  config = list()
)
```

Arguments:

`client` An api_client instance. If `NULL`, a new client will be created.

`chain` A credential_chain instance for authentication. Optional.

`endpoints` A named list where names are endpoint paths (e.g., "v1.0", "beta") and values are R6 class objects (not instances) to use for creating resources. Defaults to an empty list. If the value is `NULL`, api_resource will be used.

`config` A list of configuration options. Defaults to an empty list.

Returns: A new `api_service` object

`AuthCodeCredential` *Authorization code credential authentication*

Description

Authenticates a user through the OAuth 2.0 authorization code flow. This flow opens a web browser for the user to sign in.

Details

The authorization code flow is the standard OAuth 2.0 flow for interactive authentication. It requires a web browser and is suitable for applications where the user can interact with a browser window.

The credential supports token caching to avoid repeated authentication. Tokens can be cached to disk or in memory. A redirect URI is required for the OAuth flow to complete.

Super classes

`azr::Credential` -> `azr::InteractiveCredential` -> `AuthCodeCredential`

Methods

Public methods:

- `AuthCodeCredential$new()`
- `AuthCodeCredential$get_token()`
- `AuthCodeCredential$req_auth()`
- `AuthCodeCredential$clone()`

Method `new()`**:** Create a new authorization code credential

Usage:

```
AuthCodeCredential$new(
  scope = NULL,
  tenant_id = NULL,
  client_id = NULL,
  use_cache = "disk",
  offline = TRUE,
  redirect_uri = default_redirect_uri()
)
```

Arguments:

`scope` A character string specifying the OAuth2 scope. Defaults to `NULL`.

`tenant_id` A character string specifying the Azure Active Directory tenant ID. Defaults to `NULL`.

`client_id` A character string specifying the application (client) ID. Defaults to `NULL`.

`use_cache` A character string specifying the cache type. Use `"disk"` for disk-based caching or `"memory"` for in-memory caching. Defaults to `"disk"`.

`offline` A logical value indicating whether to request offline access (refresh tokens). Defaults to `TRUE`.

`redirect_uri` A character string specifying the redirect URI registered with the application. Defaults to `default_redirect_uri()`.

Returns: A new `AuthCodeCredential` object

Method `get_token()`**:** Get an access token using authorization code flow

Usage:

```
AuthCodeCredential$get_token(reauth = FALSE)
```

Arguments:

`reauth` A logical value indicating whether to force reauthentication. Defaults to `FALSE`.

Returns: An `httr2::oauth_token()` object containing the access token

Method `req_auth()`**:** Add OAuth authorization code authentication to an httr2 request

Usage:

```
AuthCodeCredential$req_auth(req)
```

Arguments:

`req` An `httr2::request()` object

Returns: The request object with OAuth authorization code authentication configured

Method `clone()`**:** The objects of this class are cloneable with this method.

Usage:

```
AuthCodeCredential$clone(deep = FALSE)
```

Arguments:

`deep` Whether to make a deep clone.

Examples

```
# AuthCodeCredential requires an interactive session
## Not run:
# Create credential with default settings
cred <- AuthCodeCredential$new(
  tenant_id = "your-tenant-id",
  client_id = "your-client-id",
  scope = "https://management.azure.com/.default"
)

# Get an access token (will open browser for authentication)
token <- cred$get_token()

# Force reauthentication
token <- cred$get_token(reauth = TRUE)

# Use with httr2 request
req <- httr2::request("https://management.azure.com/subscriptions")
req <- cred$req_auth(req)

## End(Not run)
```

azr_graph_client *Create a Microsoft Graph API Client*

Description

Creates a configured client for the Microsoft Graph API with authentication and versioned endpoints (v1.0 and beta). This function returns an api_service object that provides access to Microsoft Graph resources through versioned endpoints.

Usage

```
azr_graph_client(scopes = ".default", ..., chain = NULL)
```

Arguments

scopes	A character string specifying the OAuth2 scope suffix to be appended to the Graph API URL. Defaults to ".default", which requests all permissions the app has been granted. The full scope will be https://graph.microsoft.com/{scopes}.
...	Additional arguments passed to the api_client constructor.
chain	A credential_chain instance for authentication. If NULL, a default credential chain will be created using DefaultCredential.

Details

The function creates a Microsoft Graph service using these components:

- **api_client**: A general-purpose API client configured with the Graph API host URL (https://graph.microsoft.com) and authentication provider.
- **api_graph_resource**: A specialized resource class that extends api_resource with Microsoft Graph-specific methods. Currently implements:
  - me(select = NULL): Fetch the current user's profile. The select parameter accepts a character vector of properties to return (e.g., c("displayName", "mail")).
- **api_service**: A service container that combines the client and resources with versioned endpoints (v1.0 and beta). The service is locked using lockEnvironment() to prevent modification after creation.

Value

An api_service object configured for Microsoft Graph API with v1.0 and beta endpoints. The object is locked using lockEnvironment() to prevent modification after creation. Access endpoints via $v1.0 or $beta.

Examples

```
## Not run:
# Create a Graph API client with default credentials
graph <- azr_graph_client()

# Fetch current user profile from v1.0 endpoint
me <- graph$v1.0$me()

# Fetch specific properties using OData $select
me <- graph$v1.0$me(select = c("displayName", "mail", "userPrincipalName"))

# Use beta endpoint for preview features
me_beta <- graph$beta$me(select = c("displayName", "mail"))

# Create with a custom credential chain
custom_chain <- credential_chain(
  AzureCLICredential$new(scope = "https://graph.microsoft.com/.default")
)
graph <- azr_graph_client(chain = custom_chain)

# Use specific scopes instead of .default
graph <- azr_graph_client(scopes = "User.Read Mail.Read")

## End(Not run)
```

`AzureCLICredential` *Azure CLI credential authentication*

Description

Authenticates using the Azure CLI (`az`) command-line tool. This credential requires the Azure CLI to be installed and the user to be logged in via `az login`.

Details

The credential uses the `az account get-access-token` command to retrieve access tokens. It will use the currently active Azure CLI account and subscription unless a specific tenant is specified.

Super class

`azr::Credential` -> `AzureCLICredential`

Public fields

`.process_timeout` Timeout in seconds for Azure CLI command execution

Methods

Public methods:

- AzureCLICredential$new()
- AzureCLICredential$get_token()
- AzureCLICredential$req_auth()
- AzureCLICredential$account_show()
- AzureCLICredential$login()
- AzureCLICredential$logout()
- AzureCLICredential$clone()

Method `new()`**:** Create a new Azure CLI credential

Usage:

```
AzureCLICredential$new(
  scope = NULL,
  tenant_id = NULL,
  process_timeout = NULL,
  login = FALSE,
  use_bridge = FALSE
)
```

Arguments:

`scope` A character string specifying the OAuth2 scope. Defaults to `NULL`, which uses the scope set during initialization.

`tenant_id` A character string specifying the Azure Active Directory tenant ID. Defaults to `NULL`, which uses the default tenant from Azure CLI.

`process_timeout` A numeric value specifying the timeout in seconds for the Azure CLI process. Defaults to `10`.

`login` A logical value indicating whether to check if the user is logged in and perform login if needed. Defaults to `FALSE`.

`use_bridge` A logical value indicating whether to use the device code bridge webpage during login. If `TRUE`, launches an intermediate local webpage that displays the device code and facilitates copy-pasting before redirecting to the Microsoft device login page. Only used when `login = TRUE`. Defaults to `FALSE`.

Returns: A new `AzureCLICredential` object

Method `get_token()`**:** Get an access token from Azure CLI

Usage:

```
AzureCLICredential$get_token(scope = NULL)
```

Arguments:

`scope` A character string specifying the OAuth2 scope. If `NULL`, uses the scope specified during initialization.

Returns: An `httr2::oauth_token()` object containing the access token

Method `req_auth()`**:** Add authentication to an httr2 request

Usage:

```
AzureCLICredential$req_auth(req, scope = NULL)
```

Arguments:

`req` An `httr2::request()` object

`scope` A character string specifying the OAuth2 scope. If `NULL`, uses the scope specified during initialization.

Returns: The request object with authentication header added

Method `account_show()`**:** Show the currently active Azure CLI account information

Usage:

```
AzureCLICredential$account_show(timeout = NULL)
```

Arguments:

`timeout` A numeric value specifying the timeout in seconds for the Azure CLI command. If `NULL`, uses the process timeout specified during initialization.

Returns: A list containing the account information from Azure CLI

Method `login()`**:** Perform Azure CLI login using device code flow

Usage:

```
AzureCLICredential$login()
```

Returns: Invisibly returns the exit status (0 for success, non-zero for failure)

Method `logout()`**:** Log out from Azure CLI

Usage:

```
AzureCLICredential$logout()
```

Returns: Invisibly returns `NULL`

Method `clone()`**:** The objects of this class are cloneable with this method.

Usage:

```
AzureCLICredential$clone(deep = FALSE)
```

Arguments:

`deep` Whether to make a deep clone.

Examples

```
# Create credential with default settings
cred <- AzureCLICredential$new()

# Create credential with specific scope and tenant
cred <- AzureCLICredential$new(
  scope = "https://management.azure.com/.default",
  tenant_id = "your-tenant-id"
)

# To get a token or authenticate a request it is required that
# 'az login' is successfully executed, otherwise it will return an error.
```

```
## Not run:
# Get an access token
token <- cred$get_token()

# Use with httr2 request
req <- httr2::request("https://management.azure.com/subscriptions")
resp <- httr2::req_perform(cred$req_auth(req))

## End(Not run)
```

`az_cli_account_show` *Show Azure CLI Account Information*

Description

Retrieves information about the currently active Azure CLI account and subscription. This function runs `az account show` and parses the JSON output into an R list.

Usage

```
az_cli_account_show(timeout = 10L)
```

Arguments

`timeout`	An integer specifying the timeout in seconds for the Azure CLI command. Defaults to `10`.

Details

The function returns details about the current Azure subscription including:

- Subscription ID and name
- Tenant ID
- Account state (e.g., "Enabled")
- User information
- Cloud environment details

Value

A list containing the account information from Azure CLI

Examples

```
## Not run:
# Get current account information
account_info <- az_cli_account_show()

# Access subscription ID
subscription_id <- account_info$id

# Access tenant ID
tenant_id <- account_info$tenantId

## End(Not run)
```

`az_cli_get_token` *Get Access Token from Azure CLI*

Description

Retrieves an access token from Azure CLI using the `az account get-access-token` command. This is a lower-level function that directly interacts with the Azure CLI to obtain OAuth2 tokens.

Usage

```
az_cli_get_token(scope, tenant_id = NULL, timeout = 10L)
```

Arguments

`scope`	A character string specifying the OAuth2 scope for which to request the access token (e.g., `"https://management.azure.com/.default"`).
`tenant_id`	A character string specifying the Azure Active Directory tenant ID. If `NULL`, uses the default tenant from Azure CLI. Defaults to `NULL`.
`timeout`	A numeric value specifying the timeout in seconds for the Azure CLI process. Defaults to `10`.

Details

This function executes the Azure CLI command and parses the JSON response to create an httr2 OAuth token object. The token includes the access token, token type, and expiration time.

Value

An `httr2::oauth_token()` object containing:

- `access_token`: The OAuth2 access token string
- `token_type`: The type of token (typically "Bearer")
- `.expires_at`: POSIXct timestamp when the token expires

Examples

```
## Not run:
# Get a token for Azure Resource Manager
token <- az_cli_get_token(
  scope = "https://management.azure.com/.default"
)

# Get a token for a specific tenant
token <- az_cli_get_token(
  scope = "https://graph.microsoft.com/.default",
  tenant_id = "your-tenant-id"
)

# Access the token string
access_token <- token$access_token

## End(Not run)
```

---

az_cli_is_login *Check if User is Logged in to Azure CLI*

Description

Checks whether the user is currently logged in to Azure CLI by attempting to retrieve account information.

Usage

```
az_cli_is_login(timeout = 10L)
```

Arguments

`timeout`	A numeric value specifying the timeout in seconds for the Azure CLI command. Defaults to `10`.

Value

A logical value: `TRUE` if the user is logged in, `FALSE` otherwise

Examples

```
## Not run:
# Check if logged in
if (az_cli_is_login()) {
  message("User is logged in")
} else {
  message("User is not logged in")
}
```

```
## End(Not run)
```

---

az_cli_login *Azure CLI Device Code Login*

Description

Performs an interactive Azure CLI login using device code flow. Automatically captures the device code, copies it to the clipboard, and opens the browser for authentication.

Usage

```
az_cli_login(tenant_id = NULL, use_bridge = FALSE, verbose = FALSE)
```

Arguments

tenant_id	A character string specifying the Azure Active Directory tenant ID to authenticate against. If NULL (default), uses the default tenant from Azure CLI configuration.
use_bridge	A logical value indicating whether to use the device code bridge webpage. If TRUE, launches an intermediate local webpage that displays the device code and facilitates copy-pasting before redirecting to the Microsoft device login page. If FALSE (default), copies the code directly to the clipboard and opens the Microsoft login page.
verbose	A logical value indicating whether to print detailed process output to the console, including error messages from the Azure CLI process. If FALSE (default), only essential messages are displayed.

Details

This function runs `az login --use-device-code`, monitors the output to extract the device code, copies it to the clipboard, and opens the authentication URL in the default browser.

Value

Invisibly returns the exit status (0 for success, non-zero for failure)

Examples

```
## Not run:
# Perform Azure CLI login with device code flow
az_cli_login()

# Use the bridge webpage for easier code handling
az_cli_login(use_bridge = TRUE)
```

```
# Login to a specific tenant with verbose output
az_cli_login(tenant_id = "your-tenant-id", verbose = TRUE)

## End(Not run)
```

`az_cli_logout` *Azure CLI Logout*

Description

Logs out from Azure CLI by removing all stored credentials and account information. This function runs `az logout`.

Usage

```
az_cli_logout()
```

Details

After logging out, you will need to run `az_cli_login()` again to authenticate and use Azure CLI credentials.

Value

Invisibly returns `NULL`

Examples

```
## Not run:
# Log out from Azure CLI
az_cli_logout()

## End(Not run)
```

`ClientSecretCredential`
Client secret credential authentication

Description

Authenticates a service principal using a client ID and client secret. This credential is commonly used for application authentication in Azure.

Details

The credential uses the OAuth 2.0 client credentials flow to obtain access tokens. It requires a registered Azure AD application with a client secret. The client secret should be stored securely and not hard-coded in scripts.

Super class

`azr::Credential` -> `ClientSecretCredential`

Methods

Public methods:

- `ClientSecretCredential$validate()`
- `ClientSecretCredential$get_token()`
- `ClientSecretCredential$req_auth()`
- `ClientSecretCredential$clone()`

Method `validate()`**:** Validate the credential configuration

Usage:

```
ClientSecretCredential$validate()
```

Details: Checks that the client secret is provided and not NA or NULL. Calls the parent class validation method.

Method `get_token()`**:** Get an access token using client credentials flow

Usage:

```
ClientSecretCredential$get_token()
```

Returns: An `httr2::oauth_token()` object containing the access token

Method `req_auth()`**:** Add OAuth client credentials authentication to an httr2 request

Usage:

```
ClientSecretCredential$req_auth(req)
```

Arguments:

`req` An `httr2::request()` object

Returns: The request object with OAuth client credentials authentication configured

Method `clone()`**:** The objects of this class are cloneable with this method.

Usage:

```
ClientSecretCredential$clone(deep = FALSE)
```

Arguments:

`deep` Whether to make a deep clone.

Examples

```
# Create credential with client secret
cred <- ClientSecretCredential$new(
  tenant_id = "your-tenant-id",
  client_id = "your-client-id",
  client_secret = "your-client-secret",
  scope = "https://management.azure.com/.default"
)

# To get a token or authenticate a request it requires
# valid 'client_id' and 'client_secret' credentials,
# otherwise it will return an error.
## Not run:
# Get an access token
token <- cred$get_token()

# Use with httr2 request
req <- httr2::request("https://management.azure.com/subscriptions")
resp <- httr2::req_perform(cred$req_auth(req))

## End(Not run)
```

---

credential_chain *Create Custom Credential Chain*

Description

Creates a custom chain of credential providers to attempt during authentication. Credentials are tried in the order they are provided until one successfully authenticates. This allows you to customize the authentication flow beyond the default credential chain.

Usage

```
credential_chain(...)
```

Arguments

`...`	Named credential objects or credential classes. Each element should be a credential class (e.g., `ClientSecretCredential`) or an instantiated credential object that inherits from the `Credential` base class. The names are used for identification purposes.

Value

A `credential_chain` object containing the specified sequence of credential providers.

See Also

`default_credential_chain()`, `get_token_provider()`

Examples

```
# Create a custom chain with only non-interactive credentials
custom_chain <- credential_chain(
  client_secret = ClientSecretCredential,
  azure_cli = AzureCLICredential
)

# Use the custom chain to get a token
## Not run:
token <- get_token(
  scope = "https://graph.microsoft.com/.default",
  chain = custom_chain
)

## End(Not run)
```

DefaultCredential *Default credential authentication*

Description

An R6 class that provides lazy initialization of credential providers. The credential provider is created on first access using the default credential chain.

Details

This class wraps the credential discovery process in an R6 object with a lazily evaluated `provider` field. The provider is only created when first accessed, using the same logic as `get_token_provider()`.

Public fields

`.scope` Character string specifying the authentication scope.

`.tenant_id` Character string specifying the tenant ID.

`.client_id` Character string specifying the client ID.

`.client_secret` Character string specifying the client secret.

`.use_cache` Character string indicating the caching strategy.

`.offline` Logical indicating whether to request offline access.

`.chain` A credential chain object for authentication.

Active bindings

`provider` Lazily initialized credential provider

Methods

Public methods:

- DefaultCredential$new()
- DefaultCredential$get_token()
- DefaultCredential$req_auth()
- DefaultCredential$clone()

Method `new()`**:** Create a new DefaultCredential object

Usage:

```
DefaultCredential$new(
  scope = NULL,
  tenant_id = NULL,
  client_id = NULL,
  client_secret = NULL,
  use_cache = "disk",
  offline = TRUE,
  chain = default_credential_chain()
)
```

Arguments:

`scope` Optional character string specifying the authentication scope.

`tenant_id` Optional character string specifying the tenant ID for authentication.

`client_id` Optional character string specifying the client ID for authentication.

`client_secret` Optional character string specifying the client secret for authentication.

`use_cache` Character string indicating the caching strategy. Defaults to `"disk"`. Options include `"disk"` for disk-based caching or `"memory"` for in-memory caching.

`offline` Logical. If `TRUE`, adds 'offline_access' to the scope to request a 'refresh_token'. Defaults to `TRUE`.

`chain` A list of credential objects, where each element must inherit from the `Credential` base class. Credentials are attempted in the order provided until `get_token` succeeds.

Returns: A new `DefaultCredential` object

Method `get_token()`**:** Get an access token using the credential chain

Usage:

```
DefaultCredential$get_token()
```

Returns: An `httr2::oauth_token()` object containing the access token

Method `req_auth()`**:** Add authentication to an httr2 request

Usage:

```
DefaultCredential$req_auth(req)
```

Arguments:

`req` An `httr2::request()` object

Returns: The request object with authentication configured

Method `clone()`**:** The objects of this class are cloneable with this method.

Usage:

```
DefaultCredential$clone(deep = FALSE)
```

Arguments:

deep Whether to make a deep clone.

Examples

```
# Create a DefaultCredential object
cred <- DefaultCredential$new(
  scope = "https://graph.microsoft.com/.default",
  tenant_id = "my-tenant-id"
)

## Not run:
# Get a token (triggers lazy initialization)
token <- cred$get_token()

# Authenticate a request
req <- httr2::request("https://management.azure.com/subscriptions")
resp <- httr2::req_perform(cred$req_auth(req))

# Or access the provider directly
provider <- cred$provider

## End(Not run)
```

---

default_azure_client_id

Get default Azure client ID

Description

Retrieves the Azure client ID from the AZURE_CLIENT_ID environment variable, or falls back to the default Azure CLI client ID if not set.

Usage

```
default_azure_client_id()
```

Value

A character string with the client ID

Examples

```
default_azure_client_id()
```

default_azure_client_secret

Get default Azure client secret

Description

Retrieves the Azure client secret from the AZURE_CLIENT_SECRET environment variable, or returns NA_character_ if not set.

Usage

```
default_azure_client_secret()
```

Value

A character string with the client secret, or NA_character_ if not set

Examples

```
default_azure_client_secret()
```

default_azure_config_dir

Get default Azure configuration directory

Description

Retrieves the Azure configuration directory from the AZURE_CONFIG_DIR environment variable, or falls back to the platform-specific default.

Usage

```
default_azure_config_dir()
```

Value

A character string with the Azure configuration directory path

Examples

```
default_azure_config_dir()
```

default_azure_host *Get default Azure authority host*

Description

Retrieves the Azure authority host from the AZURE_AUTHORITY_HOST environment variable, or falls back to Azure Public Cloud if not set.

Usage

```
default_azure_host()
```

Value

A character string with the authority host URL

Examples

```
default_azure_host()
```

default_azure_oauth_client *Create default Azure OAuth client*

Description

Creates an `httr2::oauth_client()` configured for Azure authentication.

Usage

```
default_azure_oauth_client(
  client_id = default_azure_client_id(),
  client_secret = NULL,
  name = NULL
)
```

Arguments

client_id	A character string specifying the client ID. Defaults to `default_azure_client_id()`.
client_secret	A character string specifying the client secret. Defaults to NULL.
name	A character string specifying the client name. Defaults to NULL.

Value

An `httr2::oauth_client()` object

Examples

```
client <- default_azure_oauth_client()
client <- default_azure_oauth_client(
  client_id = "my-client-id",
  client_secret = "my-secret"
)
```

`default_azure_scope` *Get default Azure OAuth scope*

Description

Returns the default OAuth scope for a specified Azure resource.

Usage

```
default_azure_scope(resource = "azure_arm")
```

Arguments

`resource`	A character string specifying the Azure resource. Must be one of: `"azure_arm"` (Azure Resource Manager), `"azure_graph"` (Microsoft Graph), `"azure_storage"` (Azure Storage), or `"azure_key_vault"` (Azure Key Vault). Defaults to `"azure_arm"`.

Value

A character string with the OAuth scope URL

Examples

```
default_azure_scope()
default_azure_scope("azure_graph")
```

`default_azure_tenant_id` *Get default Azure tenant ID*

Description

Retrieves the Azure tenant ID from the `AZURE_TENANT_ID` environment variable, or falls back to the default value if not set.

Usage

```
default_azure_tenant_id()
```

Value

A character string with the tenant ID

Examples

```
default_azure_tenant_id()
```

`default_azure_url` *Get default Azure OAuth URLs*

Description

Constructs Azure OAuth 2.0 endpoint URLs for a given tenant and authority host.

Usage

```
default_azure_url(
  endpoint = NULL,
  oauth_host = default_azure_host(),
  tenant_id = default_azure_tenant_id()
)
```

Arguments

`endpoint`	A character string specifying which endpoint URL to return. Must be one of: `"authorize"`, `"token"`, or `"devicecode"`. If `NULL` (default), returns a list of all endpoint URLs.
`oauth_host`	A character string specifying the Azure authority host. Defaults to `default_azure_host()`.
`tenant_id`	A character string specifying the tenant ID. Defaults to `default_azure_tenant_id()`.

Value

If `endpoint` is specified, returns a character string with the URL. If `endpoint` is `NULL`, returns a named list of all endpoint URLs.

Examples

```
# Get all URLs
default_azure_url()

# Get specific endpoint
default_azure_url("token")

# Custom tenant
default_azure_url("authorize", tenant_id = "my-tenant-id")
```

default_credential_chain *Create Default Credential Chain*

Description

Creates the default chain of credentials to attempt during authentication. The credentials are tried in order until one successfully authenticates. The default chain includes:

1. Client Secret Credential - Uses client ID and secret
2. Authorization Code Credential - Interactive browser-based authentication
3. Azure CLI Credential - Uses credentials from Azure CLI
4. Device Code Credential - Interactive device code flow

Usage

```
default_credential_chain()
```

Value

A `credential_chain` object containing the default sequence of credential providers.

See Also

`credential_chain()`, `get_token_provider()`

---

default_non_auth *Default No Authentication*

Description

A pass-through credential function that performs no authentication. This function returns the request object unchanged, allowing API calls to be made without adding any authentication headers or tokens.

Usage

```
default_non_auth(req)
```

Arguments

`req`	An `httr2::request()` object

Value

The same `httr2::request()` object, unmodified

default_redirect_uri *Get default OAuth redirect URI*

Description

Constructs a redirect URI for OAuth flows. If the provided URI doesn't have a port, assigns a random port using `httpuv::randomPort()`.

Usage

```
default_redirect_uri(redirect_uri = httr2::oauth_redirect_uri())
```

Arguments

`redirect_uri`	A character string specifying the redirect URI. Defaults to `httr2::oauth_redirect_uri()`.

Value

A character string with the redirect URI

Examples

```
default_redirect_uri()
```

default_response_handler *Default Response Handler*

Description

Default callback function for processing API response content. This function converts data frames within lists to data.table objects for better performance and functionality, if the data.table package is available.

Usage

```
default_response_handler()
```

Details

The function recursively processes list responses and converts any data.frame objects to data.table objects using `data.table::as.data.table()`, but only if the data.table package is installed. If data.table is not available, data frames are returned unchanged. Non-data.frame elements are always returned unchanged.

Value

A function that accepts parsed response content and returns processed content

Examples

```
# Get the default handler
handler <- default_response_handler()

# Use with a custom handler
custom_handler <- function(content) {
  # Your custom processing logic
  content
}
```

DeviceCodeCredential *Device code credential authentication*

Description

Authenticates a user through the device code flow. This flow is designed for devices that don't have a web browser or have input constraints.

Details

The device code flow displays a code that the user must enter on another device with a web browser to complete authentication. This is ideal for CLI applications, headless servers, or devices without a browser.

The credential supports token caching to avoid repeated authentication. Tokens can be cached to disk or in memory.

Super classes

`azr::Credential` -> `azr::InteractiveCredential` -> `DeviceCodeCredential`

Methods

Public methods:

- `DeviceCodeCredential$new()`
- `DeviceCodeCredential$get_token()`
- `DeviceCodeCredential$req_auth()`
- `DeviceCodeCredential$clone()`

Method `new()`**:** Create a new device code credential

Usage:

```
DeviceCodeCredential$new(
  scope = NULL,
  tenant_id = NULL,
  client_id = NULL,
  use_cache = "disk",
  offline = TRUE
)
```

Arguments:

`scope` A character string specifying the OAuth2 scope. Defaults to `NULL`.

`tenant_id` A character string specifying the Azure Active Directory tenant ID. Defaults to `NULL`.

`client_id` A character string specifying the application (client) ID. Defaults to `NULL`.

`use_cache` A character string specifying the cache type. Use `"disk"` for disk-based caching or `"memory"` for in-memory caching. Defaults to `"disk"`.

`offline` A logical value indicating whether to request offline access (refresh tokens). Defaults to `TRUE`.

Returns: A new `DeviceCodeCredential` object

Method `get_token()`**:** Get an access token using device code flow

Usage:

```
DeviceCodeCredential$get_token(reauth = FALSE)
```

Arguments:

`reauth` A logical value indicating whether to force reauthentication. Defaults to `FALSE`.

Returns: An `httr2::oauth_token()` object containing the access token

Method `req_auth()`**:** Add OAuth device code authentication to an httr2 request

Usage:

```
DeviceCodeCredential$req_auth(req)
```

Arguments:

`req` An `httr2::request()` object

Returns: The request object with OAuth device code authentication configured

Method `clone()`**:** The objects of this class are cloneable with this method.

Usage:

```
DeviceCodeCredential$clone(deep = FALSE)
```

Arguments:

`deep` Whether to make a deep clone.

Examples

```
# DeviceCodeCredential requires an interactive session
## Not run:
# Create credential with default settings
cred <- DeviceCodeCredential$new()
```

```
# Get an access token (will prompt for 'device code' flow)
token <- cred$get_token()

# Force re-authentication
token <- cred$get_token(reauth = TRUE)

# Use with httr2 request
req <- httr2::request("https://management.azure.com/subscriptions")
req <- cred$req_auth(req)

## End(Not run)
```

`get_credential_auth` *Get Credential Authentication Function*

Description

Creates a function that retrieves authentication tokens and formats them as HTTP Authorization headers. This function handles credential discovery and returns a callable method that generates Bearer token headers when invoked.

Usage

```
get_credential_auth(
  scope = NULL,
  tenant_id = NULL,
  client_id = NULL,
  client_secret = NULL,
  use_cache = "disk",
  offline = TRUE,
  chain = default_credential_chain()
)
```

Arguments

`scope`	Optional character string specifying the authentication scope.
`tenant_id`	Optional character string specifying the tenant ID for authentication.
`client_id`	Optional character string specifying the client ID for authentication.
`client_secret`	Optional character string specifying the client secret for authentication.
`use_cache`	Character string indicating the caching strategy. Defaults to `"disk"`. Options include `"disk"` for disk-based caching or `"memory"` for in-memory caching.
`offline`	Logical. If `TRUE`, adds 'offline_access' to the scope to request a 'refresh_token'. Defaults to `TRUE`.
`chain`	A list of credential objects, where each element must inherit from the `Credential` base class. Credentials are attempted in the order provided until `get_token` succeeds.

Value

A function that, when called, returns a named list with an `Authorization` element containing the Bearer token, suitable for use with `httr2::req_headers()`.

See Also

`get_token()`, `get_request_authorizer()`, `get_token_provider()`

Examples

```
## Not run:
# Create an authentication function
auth_fn <- get_credential_auth(
  scope = "https://graph.microsoft.com/.default"
)

# Call it to get headers
auth_headers <- auth_fn()

# Use with httr2
req <- httr2::request("https://graph.microsoft.com/v1.0/me") |>
  httr2::req_headers(!!!auth_headers)

## End(Not run)
```

---

get_credential_provider

Get Credential Provider

Description

Discovers and returns an authenticated credential object from a chain of credential providers. This function attempts each credential in the chain until one successfully authenticates, returning the first successful credential object.

Usage

```
get_credential_provider(
  scope = NULL,
  tenant_id = NULL,
  client_id = NULL,
  client_secret = NULL,
  use_cache = "disk",
  offline = TRUE,
  oauth_host = NULL,
  oauth_endpoint = NULL,
  chain = NULL
)
```

Arguments

scope	Optional character string specifying the authentication scope.
tenant_id	Optional character string specifying the tenant ID for authentication.
client_id	Optional character string specifying the client ID for authentication.
client_secret	Optional character string specifying the client secret for authentication.
use_cache	Character string indicating the caching strategy. Defaults to "disk". Options include "disk" for disk-based caching or "memory" for in-memory caching.
offline	Logical. If TRUE, adds 'offline_access' to the scope to request a 'refresh_token'. Defaults to TRUE.
oauth_host	Optional character string specifying the OAuth host URL.
oauth_endpoint	Optional character string specifying the OAuth endpoint.
chain	A list of credential objects, where each element must inherit from the Credential base class. Credentials are attempted in the order provided until get_token succeeds. If NULL, uses default_credential_chain().

Value

A credential object that inherits from the Credential class and has successfully authenticated.

See Also

get_token_provider(), get_request_authorizer(), default_credential_chain()

Examples

```
## Not run:
# Get a credential provider with default settings
cred <- get_credential_provider(
  scope = "https://graph.microsoft.com/.default",
  tenant_id = "my-tenant-id"
)

# Use the credential to get a token
token <- cred$get_token()

## End(Not run)
```

---

get_request_authorizer

Get Default Request Authorizer Function

Description

Creates a request authorizer function that retrieves authentication credentials and returns a callable request authorization method. This function handles the credential discovery process and returns the request authentication method from the discovered credential object.

Usage

```
get_request_authorizer(
  scope = NULL,
  tenant_id = NULL,
  client_id = NULL,
  client_secret = NULL,
  use_cache = "disk",
  offline = TRUE,
  chain = default_credential_chain()
)
```

Arguments

scope	Optional character string specifying the authentication scope.
tenant_id	Optional character string specifying the tenant ID for authentication.
client_id	Optional character string specifying the client ID for authentication.
client_secret	Optional character string specifying the client secret for authentication.
use_cache	Character string indicating the caching strategy. Defaults to "disk". Options include "disk" for disk-based caching or "memory" for in-memory caching.
offline	Logical. If TRUE, adds 'offline_access' to the scope to request a 'refresh_token'. Defaults to TRUE.
chain	A list of credential objects, where each element must inherit from the Credential base class. Credentials are attempted in the order provided until get_token succeeds.

Value

A function that authorizes HTTP requests with appropriate credentials when called.

See Also

get_token_provider(), get_token()

Examples

```
# In non-interactive sessions, this function will return an error if the
# environment is not setup with valid credentials. And in an interactive session
# the user will be prompted to attempt one of the interactive authentication flows.
## Not run:
req_auth <- get_request_authorizer(
  scope = "https://graph.microsoft.com/.default"
)
req <- req_auth(httr2::request("https://graph.microsoft.com/v1.0/me"))

## End(Not run)
```

get_token *Get Authentication Token*

Description

Retrieves an authentication token using the default token provider. This is a convenience function that combines credential discovery and token acquisition in a single step.

Usage

```
get_token(
  scope = NULL,
  tenant_id = NULL,
  client_id = NULL,
  client_secret = NULL,
  use_cache = "disk",
  offline = TRUE,
  chain = default_credential_chain()
)
```

Arguments

scope	Optional character string specifying the authentication scope.
tenant_id	Optional character string specifying the tenant ID for authentication.
client_id	Optional character string specifying the client ID for authentication.
client_secret	Optional character string specifying the client secret for authentication.
use_cache	Character string indicating the caching strategy. Defaults to "disk". Options include "disk" for disk-based caching or "memory" for in-memory caching.
offline	Logical. If TRUE, adds 'offline_access' to the scope to request a 'refresh_token'. Defaults to TRUE.
chain	A list of credential objects, where each element must inherit from the Credential base class. Credentials are attempted in the order provided until get_token succeeds.

Value

An httr2::oauth_token() object.

See Also

get_token_provider(), get_request_authorizer()

Examples

```
# In non-interactive sessions, this function will return an error if the
# environment is not setup with valid credentials. And in an interactive session
# the user will be prompted to attempt one of the interactive authentication flows.
## Not run:
token <- get_token(
  scope = "https://graph.microsoft.com/.default",
  tenant_id = "my-tenant-id",
  client_id = "my-client-id",
  client_secret = "my-secret"
)

## End(Not run)
```

`get_token_provider` *Get Default Token Provider Function*

Description

Creates a token provider function that retrieves authentication credentials and returns a callable token getter. This function handles the credential discovery process and returns the token acquisition method from the discovered credential object.

Usage

```
get_token_provider(
  scope = NULL,
  tenant_id = NULL,
  client_id = NULL,
  client_secret = NULL,
  use_cache = "disk",
  offline = TRUE,
  chain = default_credential_chain()
)
```

Arguments

`scope`	Optional character string specifying the authentication scope.
`tenant_id`	Optional character string specifying the tenant ID for authentication.
`client_id`	Optional character string specifying the client ID for authentication.
`client_secret`	Optional character string specifying the client secret for authentication.
`use_cache`	Character string indicating the caching strategy. Defaults to `"disk"`. Options include `"disk"` for disk-based caching or `"memory"` for in-memory caching.
`offline`	Logical. If `TRUE`, adds 'offline_access' to the scope to request a 'refresh_token'. Defaults to `TRUE`.

chain — A list of credential objects, where each element must inherit from the `Credential` base class. Credentials are attempted in the order provided until `get_token` succeeds.

Value

A function that retrieves and returns an authentication token when called.

See Also

`get_request_authorizer()`, `get_token()`

Examples

```
# In non-interactive sessions, this function will return an error if the
# environment is not set up with valid credentials. In an interactive session
# the user will be prompted to attempt one of the interactive authentication flows.
## Not run:
token_provider <- get_token_provider(
  scope = "https://graph.microsoft.com/.default",
  tenant_id = "my-tenant-id",
  client_id = "my-client-id",
  client_secret = "my-secret"
)
token <- token_provider()

## End(Not run)
```

---

is_hosted_session *Detect if running in a hosted session*

Description

Determines whether the current R session is running in a hosted environment such as Google Colab or RStudio Server (non-localhost).

Usage

```
is_hosted_session()
```

Details

This function checks for:

- Google Colab: presence of the `COLAB_RELEASE_TAG` environment variable
- RStudio Server: `RSTUDIO_PROGRAM_MODE` is "server" and `RSTUDIO_HTTP_REFERER` does not contain "localhost"

Value

A logical value: TRUE if running in a hosted session (Google Colab or remote RStudio Server), FALSE otherwise.

Examples

```
if (is_hosted_session()) {
  message("Running in a hosted environment")
}
```

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