Package 'iSEEindex'

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Description This package provides an interface to any collection of data sets within a single iSEE web-application. The main functionality of this package is to define a custom landing page allowing app maintainers to list a custom collection of data sets that users can selected from and directly load objects into an iSEE web-application.

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`iSEEindex-package` *iSEEindex: iSEE extension for a landing page to a custom collection of data sets*

Description

This package provides an interface to any collection of data sets within a single iSEE web-application. The main functionality of this package is to define a custom landing page allowing app maintainers to list a custom collection of data sets that users can select from and directly load objects into an iSEE web-application.

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See Also

Useful links:

- https://github.com/iSEE/iSEEindex
- Report bugs at https://support.bioconductor.org/t/iSEEindex

iSEEindex *iSEEindex App*

Description

Generate an **iSEE** app that includes a landing page enabling users to choose from a custom set of data sets and initial configuration states prepared by the app maintainer.

Usage

```
iSEEindex(
  bfc,
  FUN.datasets,
  FUN.initial = NULL,
  default.add = TRUE,
  default.position = c("first", "last"),
  app.title = NULL,
  body.header = NULL,
  body.footer = NULL
)
```

Arguments

bfc	An BiocFileCache() object.
FUN.datasets	A function that returns a list of metadata for available data sets.
FUN.initial	A function that returns a list of metadata for available initial configuration states.
default.add	Logical scalar indicating whether a default initial configuration should be added as a choice in the Shiny selectizeInput(). See iSEEindex().
default.position	Character scalar indicating whether the default initial configuration should be added as the "first" or "last" option in the Shiny selectizeInput().
app.title	Character string to specify the desired title to be displayed in the main window of the dashboard. Defaults to NULL, which displays some info on the versions of the iSEEindex and iSEE packages.
body.header	UI element to display *above* the main landing page body.
body.footer	UI element to display *below* the main landing page body.

Value

An iSEE::iSEE() app with a custom landing page using a BiocFileCache() to cache a selection of data sets.

Data Sets

The function passed to the argument FUN.datasets must return a list that contains metadata about the available data sets.

For each data set, required metadata are:

id A unique identifier for the data set.

title A short human-readable title for the data set, displayed in the 'Info' panel when the data set is selected.

uri A Uniform Resource Identifier (URI) that indicates the location of the data file that contains the data set.

description A more detailed description of the data set, displayed in the 'Info' panel when the data set is selected.

Example:

```
list(
  list(
    id = "dataset01",
    title = "Dataset 01",
    uri = "https://example.com/1.rds",
    description = "My first data set."
  ),
  list(
    id = "dataset02",
    title = "Dataset 02",
    uri = "https://example.com/1.rds",
    description = "My second data set."
  )
)
```

The individual sub-lists may also contain optional named metadata specific to individual `iSEEindexResource` classes (refer to the help page of those classes for details).

Important: The `id` value is used to identify the data set file in the **BiocFileCache**. Thus, we recommend using a dedicated `BiocFileCache()` for the app, using the `BiocFileCache(cache)` argument to specify an on-disk location (directory path) for the dedicated cache.

Initial Configurations

The function passed to the argument `FUN.initial` must return a `list` that contains metadata about the available initial configurations, or `NULL` in the absence of any custom initial configuration (default settings will be applied to all data sets.).

For each initial configuration, required metadata are:

id A unique identifier for the initial configuration.

title A short human-readable title for the initial configuration, representing the initial configuration in the 'Initial settings' dropdown menu.

uri A Uniform Resource Identifier (URI) that indicates the location of the R script that contains the initial configuration.

description A more detailed description of the initial configuration, displayed in the 'Configure and launch' panel when the initial configuration is selected.

For each initial configuration, optional metadata are:

datasets A series of data set identifiers for which the configuration should be made available. If missing, the configuration will be available for all data sets.

Example:

```
list(
  list(
     id = "config01",
     datasets = c("dataset01")
     title = "Configuration 01",
     uri = "https://example.com/1.R",
     description = "My first configuration."
  ),
  list(
     id = "config02",
     title = "Configuration 02",
     uri = "https://example.com/2.R",
     description = "My second configuration."
  )
)
```

The individual sub-lists may also contain additional optional named metadata specific to individual iSEEindexResource classes (refer to the help page of those classes for details).

Author(s)

Kevin Rue-Albrecht

Examples

```
library("BiocFileCache")
bfc <- BiocFileCache(cache = tempdir())

dataset_fun <- function() {
    x <- yaml::read_yaml(system.file(package = "iSEEindex", "example.yaml"))
    x$datasets
}

initial_fun <- function() {
    x <- yaml::read_yaml(system.file(package = "iSEEindex", "example.yaml"))
    x$initial
}

app <- iSEEindex(bfc, dataset_fun, initial_fun)

if (interactive()) {
    shiny::runApp(app, port = 1234)
}

## Alternatively, with the example based on using runr calls

dataset_fun_tonsils <- function() {
    x <- yaml::read_yaml(
        system.file("tonsils_example", "tonsil_package.yml", package = "iSEEindex")
    )
    x$datasets
}
initial_fun_tonsils <- function() {
    x <- yaml::read_yaml(
        system.file("tonsils_example", "tonsil_package.yml", package = "iSEEindex")
```

```
    )
    x$initial
}

library("shiny")
header_tonsils <- fluidRow(
  shinydashboard::box(
    width = 12, collapsible = TRUE, collapsed = TRUE,
    title = "How to explore the Tonsil Atlas datasets",
    includeMarkdown(
      system.file("tonsils_example", "header_tonsils.md", package = "iSEEindex")
    )
  )
)
footer_tonsils <- fluidRow(
  shinydashboard::box(
    width = 12,
    includeMarkdown(
      system.file("tonsils_example", "footer_tonsils.md", package = "iSEEindex")
    )
  )
)

app_tonsils <- iSEEindex(bfc,
    dataset_fun_tonsils,
    initial_fun_tonsils,
    default.add = TRUE,
    default.position = "last",
    app.title = "iSEE loves the Tonsil Data Atlas",
    body.header = header_tonsils,
    body.footer = footer_tonsils)

if (interactive()) {
    shiny::runApp(app_tonsils, port = 5678)
}


## This example shows that it is possible to mix different types of resources
## Some provide the path, some directly the object

dataset_fun_mix <- function() {
    x <- yaml::read_yaml(
        system.file("mixed_resources.yml", package = "iSEEindex")
    )
    x$datasets
}
initial_fun_mix <- function() {
    x <- yaml::read_yaml(
        system.file("mixed_resources.yml", package = "iSEEindex")
    )
    x$initial
}

app_mixed <- iSEEindex(bfc,
    dataset_fun_mix,
    initial_fun_mix,
    default.add = TRUE,
```

```
    default.position = "last",
    app.title = "iSEE loves multiple resource types")

if (interactive()) {
    shiny::runApp(app_mixed, port = 4242)
}
```

---

iSEEindexHttpsResource-class
The iSEEindexHttpsResource class

Description

The iSEEindexHttpsResource class represents a resource accessible through an HTTPS link. A URI for this type of resource uses the prefix "https://".

Usage

```
iSEEindexHttpsResource(x)
```

Arguments

x	List of metadata. See Details.

Details

Required metadata:

uri Character scalar. URI of the resource.

Value

The constructor function `iSEEindexHttpsResource()` returns an object of class `iSEEindexHttpsResource`.

Slot overview

This class inherits all slots from its parent class iSEEindexResource.

Supported methods

In the following code snippets, `x` is an instance of a iSEEindexHttpsResource class. Refer to the documentation for each method for more details on the remaining arguments.

- `precache(x, bfc, id, ...)` caches the resource located at the given URI using **BiocFileCache** and returns the file path to the cached file.

Author(s)

Kevin Rue-Albrecht

Examples

```
iSEEindexHttpsResource(list(uri = "https://example.com"))
```

`iSEEindexLocalhostResource-class`
The iSEEindexLocalhostResource class

Description

The iSEEindexLocalhostResource class represents a resource accessible through a local filepath. A URI for this type of resource uses the prefix "localhost://".

Usage

```
iSEEindexLocalhostResource(x)
```

Arguments

`x`	List of metadata. See Details.

Details

Required metadata:

uri Character scalar. URI of the resource.

Value

The constructor function `iSEEindexLocalhostResource()` returns an object of object of class `iSEEindexLocalhostResource`.

Slot overview

This class inherits all slots from its parent class iSEEindexResource.

Supported methods

In the following code snippets, `x` is an instance of a iSEEindexLocalhostResource class. Refer to the documentation for each method for more details on the remaining arguments.

- `precache(x, ...)` trims the `localhost://` prefix, and caches a copy of the resource located at the resulting file path using **BiocFileCache**, before returning the file path to the cached file.

Absolute and relative paths

Absolute and relative paths are both supported.

Absolute paths require an additional `/` (forward slash) following the double forward slash `//` separating the scheme component of the URI.

For instance:

- `localhost://path/to/file` refers to the relative path `path/to/file` (relative to the working directory when the Shiny application is launched).
- `localhost:///path/to/file` refers to the absolute path `/path/to/file`.

Author(s)

Kevin Rue-Albrecht

Examples

```
iSEEindexLocalhostResource(list(uri = "localhost:///example/absolute/path"))
iSEEindexLocalhostResource(list(uri = "localhost://example/relative/path"))
```

---

iSEEindexRcallResource-class

The iSEEindexRcallResource class

Description

The iSEEindexRcallResource class represents a resource accessible through the result of an R call. A URI for this type of resource uses the prefix "rcall://".

Usage

```
iSEEindexRcallResource(x)
```

Arguments

x	List of metadata. See Details.

Details

Required metadata:

uri Character scalar. R call which, once evaluated, produces a character scalar that is the URI of the resource.

Value

The constructor function `iSEEindexRcallResource()` returns an object of object of class `iSEEindexRcallResource`.

URI format

The URI must contain valid R code, once the prefix `rcall://` is removed. The code must return the path to an existing file on the local filesystem.

For instance:

```
rcall://system.file(package='iSEEindex','ReprocessedAllenData_config_01.R')
```

Slot overview

This class inherits all slots from its parent class iSEEindexResource.

Supported methods

In the following code snippets, `x` is an instance of a iSEEindexRcallResource class. Refer to the documentation for each method for more details on the remaining arguments.

- `precache(x, ...)` trims the `rcall://` prefix, evaluates the remainder of the URI as R code, and caches a copy of the resource located at the resulting file path using **BiocFileCache**, before returning the file path to the cached file.

Author(s)

Kevin Rue-Albrecht

Examples

```
iSEEindexRcallResource(list(
  uri = "rcall://system.file(package='iSEEindex','ReprocessedAllenData_config_01.R')"
))
```

---

iSEEindexResource-class

The iSEEindexResource class

Description

The iSEEindexResource class is a virtual class from which classes of supported resource must be derived.

Usage

```
## S4 method for signature 'iSEEindexResource'
show(object)

## S4 method for signature 'iSEEindexResource'
precache(x, bfc, id, ...)
```

Arguments

`object`	An `iSEEindexResource` object.
`x`	An `iSEEindexResource` object.
`bfc`	A `BiocFileCache()` object.
`id`	A data set identifier as a character scalar.
`...`	additional arguments passed to and from other methods.

Value

`show()` returns `NULL` after displaying a summary of the object.

`precache()` throws an error if no method is found for the derived class.

Slot overview

- `uri`, a character scalar specifying the URI of a resource.

Supported methods

In the following code snippets, x is an instance of a iSEEindexResource class. Refer to the documentation for each method for more details on the remaining arguments.

- precache(x, bfc, id, ...) throws an error, encouraging users to develop a method for derived classes that are not supported yet.

Author(s)

Kevin Rue-Albrecht

Examples

```
showClass("iSEEindexResource")
```

---

iSEEindexResource-generics

Generics for iSEEindexResources Objects

Description

An overview of the generics for iSEEindexResources objects.

Usage

```
precache(x, bfc, id, ...)
```

Arguments

x	An iSEEindexResource object.
bfc	A BiocFileCache() object.
id	A data set identifier as a character scalar.
...	additional arguments passed to and from other methods.

Value

precache() returns the file path to the cached copy of a resource fetched from a given URI.

Preparing and caching resources

precache(x, bfc, id, ...) retrieves and caches a resource from an URI, caches it, and returns the path to the cached file.

Author(s)

Kevin Rue-Albrecht

Examples

```
library(BiocFileCache)
bfc <- BiocFileCache(cache = tempdir())

x <- iSEEindexRcallResource(list(
  uri = "rcall://system.file(package='iSEEindex','ReprocessedAllenData_config_01.R')"
))
precache(x, bfc, "ID0")
```

---

iSEEindexRunrResource-class

The iSEEindexRunrResource class

Description

The iSEEindexRunrResource class represents an SE object, obtained directly through an R call.

Usage

```
iSEEindexRunrResource(x)
```

Arguments

x	List of metadata. See Details.

Details

A URI for this type of resource uses the prefix "runr://".

Required metadata:

uri Character scalar. URI of the resource.

Value

The constructor function `iSEEindexRunrResource()` returns an object of object of class `iSEEindexRunrResource`.

Supported methods

In the following code snippets, `x` is an instance of a iSEEindexRunrResource class. Refer to the documentation for each method for more details on the remaining arguments.

- `precache(x, bfc, id, ...)` caches the resource located at the given URI using **BiocFileCache** and returns the file path to the cached file.

Examples

```
iSEEindexRunrResource(list(
  uri = "runr://HCATonsilData::HCATonsilData(assayType = 'RNA', cellType = 'epithelial')"
))
```

`iSEEindexS3Resource-class` *The iSEEindexS3Resource class*

Description

The iSEEindexS3Resource class represents a cloud storage resource accessible via the paws.storage R package. A URI for this type of resource uses the prefix "s3://".

Usage

```
iSEEindexS3Resource(x)
```

Arguments

`x`	List of metadata. See Details.

Details

Required metadata:

uri Character scalar. URI of the resource.

Value

The constructor function `iSEEindexS3Resource()` returns an object of object of class `iSEEindexS3Resource`.

Slot overview

This class inherits all slots from its parent class iSEEindexResource.

Furthermore, this class defines the additional slot(s) below:

region AWS region.

Supported methods

In the following code snippets, `x` is an instance of a iSEEindexS3Resource class. Refer to the documentation for each method for more details on the remaining arguments.

- `precache(x, ..., temp_dir = tempdir())` trims the `s3://` prefix, parses information encoded in the remainder of the URI, downloads the resource from AWS S3 using that information, and caches a copy of the resource located at the resulting file path using **BiocFileCache**, before returning the file path to the cached file.

URI format

The URI must correspond to an existing file in an AWS S3 compatible cloud storage system.

For instance:

```
s3://bucket/prefix/index.rds
```

For details about authentication, see section "AWS Credentials" below.

Pre-caching

Additional arguments to the `precache(x, ..., temp_dir = tempdir())`:

`temp_dir` Scalar character, the directory to store the downloaded file in before it is handed over to **BiocFileCache**. This directory will be created recursively if it doesn't already exist.

AWS Credentials and region settings

For detailed information, please consult the paws R package documentation.

Currently, you must have the AWS Command Line Interface installed to use AWS SSO with **paws.storage**.

A default AWS region can be set in the file `~/.aws/config`. For instance:

```
[default]
region=eu-west-2
```

Optionally, a field named `region` can be added in the list of resource metadata to set the AWS S3 region for each individual resource, e.g.

```
- id: ID1
  title: ReprocessedAllenData
  uri: s3://example/ReprocessedAllenData.rds
  description: |
    Reprocessed Allen Data.
  region: eu-west-2
```

Regions set in individual resource metadata override the default AWS region set in `~/.aws/config` (if any). The region metadata does not need to be set for resources that should use the default region, and resource classes that do not require region information.

If a default region is NOT set in `~/.aws/config`, then the region MUST be set in the metadata.

Credentials for all services can be set in the AWS shared credentials file `~/.aws/credentials`. For instance:

```
[default]
aws_access_key_id=your AWS access key
aws_secret_access_key=your AWS secret key
```

Author(s)

Thomas Sandmann, Kevin Rue-Albrecht

Examples

```
# Without region metadata
metadata <- list(uri = "s3://example/path/to/bucket")
x <- iSEEindexS3Resource(metadata)
str(x)

# With region metadata
# NOTE: The @region slot is set to NA pending bugfix (see above).
metadata <- list(uri = "s3://example/path/to/bucket", region = "eu-west-2")
x <- iSEEindexS3Resource(metadata)
str(x)
```

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