Package 'comtrade'

May 8, 2026

Title Access and Analyse UN Comtrade International Trade Data

Version 0.1.0

Description Download and analyse international merchandise and services trade data from the United Nations Comtrade database <https://comtradeplus.un.org/>. Retrieve bilateral trade flows, compute trade analytics (revealed comparative advantage, trade concentration, trade balance), and convert between commodity classifications (HS, SITC, BEC). Covers 200+ reporter countries, 60+ years of goods trade data (1962-present), and services trade via EBOPS. Works without registration for basic queries. A free API key from <https://comtradedeveloper.un.org/> unlocks full access.

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Encoding UTF-8

Language en-GB

URL https://github.com/charlescoverdale/comtrade

BugReports https://github.com/charlescoverdale/comtrade/issues

RoxygenNote 7.3.3

Depends R (>= 4.1.0)

Imports cli (>= 3.6.0), httr2 (>= 1.0.0), stats, tools, utils

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

NeedsCompilation no

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Repository CRAN

Date/Publication 2026-04-13 14:30:02 UTC

Contents

`ct_available` *Check Data Availability*

Description

Check which years and classifications have data available for a given reporter country.

Usage

```
ct_available(reporter, cache = TRUE)
```

Arguments

`reporter`	Character. Reporter country ISO3 code.
`cache`	Logical. Cache results. Default `TRUE`.

Value

A data.frame with columns: year, classification, type (C/S), frequency (A/M).

Examples

```
op <- options(comtrade.cache_dir = tempdir())
ct_available("GBR")
options(op)
```

`ct_balance` *Trade Balance by Partner*

Description

Compute the trade balance (exports minus imports) for a reporter country against each trading partner.

Usage

```
ct_balance(
  reporter,
  partner = "0",
  year = NULL,
  commodity = "TOTAL",
  cache = TRUE
)
```

Arguments

`reporter`	Character. Reporter country ISO3 code.
`partner`	Character. Partner country code, or `"0"` for World. Default `"0"`.
`year`	Integer. Year(s) to query.
`commodity`	Character. Commodity code. Default `"TOTAL"`.
`cache`	Logical. Default `TRUE`.

Value

A data.frame with columns: partner, partner_desc, year, exports, imports, balance.

Examples

```
op <- options(comtrade.cache_dir = tempdir())
ct_balance("GBR", year = 2023)
options(op)
```

ct_cache_clear *Clear the Comtrade Cache*

Description

Remove all cached Comtrade API responses from the local cache directory.

Usage

```
ct_cache_clear()
```

Value

Invisibly returns TRUE if the cache was cleared, FALSE if no cache directory existed.

Examples

```
op <- options(comtrade.cache_dir = tempdir())
ct_cache_clear()
options(op)
```

ct_commodities *Search Commodity Codes*

Description

Search the HS (Harmonized System) commodity classification for codes matching a keyword or code pattern. Uses a built-in table of 96 two-digit HS chapters with descriptions.

Usage

```
ct_commodities(query = NULL, level = NULL)
```

Arguments

query	Character. Search term (matched against commodity descriptions) or a partial HS code (e.g., "27" for mineral fuels). Default NULL (return all).
level	Integer. HS digit level to return. Currently only level 2 is available from the built-in table. Default NULL (all levels).

Value

A data.frame with columns:

code HS 2-digit chapter code

description Chapter description

level Digit level (always 2 for built-in table)

parent Parent code (NA for 2-digit chapters)

Examples

```
# Search for petroleum-related codes
ct_commodities("petroleum")

# List all 2-digit HS chapters
ct_commodities()

# Find codes starting with "27" (mineral fuels)
ct_commodities("27")
```

`ct_compare` *Compare Countries*

Description

Compare multiple countries' trade in a given commodity, showing exports, imports, balance, and revealed comparative advantage.

Usage

```
ct_compare(reporters, commodity = "TOTAL", year = NULL, cache = TRUE)
```

Arguments

`reporters`	Character vector. ISO3 codes for countries to compare.
`commodity`	Character. Commodity code. Default `"TOTAL"`.
`year`	Integer. Year to query.
`cache`	Logical. Default `TRUE`.

Value

A data.frame with columns: reporter, reporter_desc, exports, imports, balance, rca.

Examples

```
op <- options(comtrade.cache_dir = tempdir())
ct_compare(c("GBR", "DEU", "FRA"), commodity = "87", year = 2023)
options(op)
```

ct_concordance *Convert Between Trade Classifications*

Description

Convert commodity codes between HS (Harmonized System), SITC, and BEC classifications. Uses a built-in concordance table covering the most common 2-digit HS chapters mapped to SITC sections and BEC categories.

Usage

```
ct_concordance(code, from = "HS", to = "SITC")
```

Arguments

code	Character. The commodity code(s) to convert.
from	Character. Source classification: "HS", "SITC", or "BEC".
to	Character. Target classification: "HS", "SITC", or "BEC".

Details

For detailed 4/6-digit concordances, see the concordance R package on CRAN.

Value

A data.frame with columns: from_code, from_desc, to_code, to_desc.

Examples

```
# Convert HS chapter 27 (mineral fuels) to SITC
ct_concordance("27", from = "HS", to = "SITC")

# Convert SITC section 0 (food) to HS
ct_concordance("0", from = "SITC", to = "HS")
```

ct_growth *Trade Growth Over Time*

Description

Compute year-on-year and cumulative trade growth for a bilateral flow.

Usage

```
ct_growth(
  reporter,
  partner = "0",
  commodity = "TOTAL",
  flow = "X",
  years = NULL,
  cache = TRUE
)
```

Arguments

reporter	Character. Reporter country ISO3 code.
partner	Character. Partner country code. Default "0" (World).
commodity	Character. Commodity code. Default "TOTAL".
flow	Character. "X" or "M". Default "X".
years	Integer vector. Years to query (at least 2).
cache	Logical. Default TRUE.

Value

A data.frame with columns: year, value, growth_yoy, growth_cumulative, index_100.

Examples

```
op <- options(comtrade.cache_dir = tempdir())
ct_growth("GBR", flow = "X", years = 2018:2023)
options(op)
```

---

ct_hhi *Trade Concentration Index (HHI)*

Description

Compute the Herfindahl-Hirschman Index measuring the concentration of a country's trade across partners or products.

Usage

```
ct_hhi(
  reporter,
  flow = "X",
  year = NULL,
  by = "partner",
  level = 2L,
  cache = TRUE
)
```

Arguments

reporter	Character. Reporter country ISO3 code.
flow	Character. "X" or "M". Default "X".
year	Integer. Year to query.
by	Character. Concentrate by "partner" or "product". Default "partner".
level	Integer. HS digit level (only used when by = "product"). Default 2.
cache	Logical. Default TRUE.

Details

HHI ranges from 0 (perfectly diversified) to 10,000 (single partner/product). Interpretation: < 1,500 = low concentration, 1,500-2,500 = moderate, > 2,500 = high.

Value

A data.frame with columns: year, hhi, concentration, n_items, top_item, top_share_pct.

Examples

```
op <- options(comtrade.cache_dir = tempdir())

# Export partner concentration
ct_hhi("AUS", flow = "X", year = 2023, by = "partner")

# Export product concentration
ct_hhi("AUS", flow = "X", year = 2023, by = "product")

options(op)
```

---

ct_rca *Revealed Comparative Advantage (Balassa Index)*

Description

Compute the Revealed Comparative Advantage for a country's exports. RCA > 1 indicates the country has a comparative advantage in that product.

Usage

```
ct_rca(reporter, year = NULL, level = 2L, cache = TRUE)
```

Arguments

reporter	Character. Reporter country ISO3 code.
year	Integer. Year to query.
level	Integer. HS digit level: 2, 4, or 6. Default 2.
cache	Logical. Default TRUE.

Details

The Balassa index is defined as: RCA = (country exports of product i / country total exports) / (world exports of product i / world total exports)

Value

A data.frame with columns: commodity_code, commodity_desc, reporter_value, world_value, reporter_share, world_share, rca, has_advantage.

Examples

```
op <- options(comtrade.cache_dir = tempdir())
rca <- ct_rca("AUS", year = 2023)
# Products where Australia has comparative advantage
rca[rca$has_advantage, ]
options(op)
```

---

ct_reporters *List Reporter Countries*

Description

Get the list of countries that report trade data to UN Comtrade, with their ISO3 codes and M49 numeric codes.

Usage

```
ct_reporters(cache = TRUE)
```

Arguments

cache	Logical. Cache the reference table locally. Default TRUE.

Value

A data.frame with columns:

code M49 numeric country code (used in API queries)

iso3 ISO 3166-1 alpha-3 code (e.g., GBR, USA, AUS)

name Country name

is_group Logical. TRUE for country groups (e.g., EU, OECD)

Examples

```
op <- options(comtrade.cache_dir = tempdir())
reporters <- ct_reporters()
head(reporters)
options(op)
```

`ct_services` *Get Services Trade Data*

Description

Download international services trade data from the UN Comtrade database using the EBOPS (Extended Balance of Payments Services) classification.

Usage

```
ct_services(
  reporter,
  partner = "0",
  service = "TOTAL",
  flow = c("X", "M"),
  year = NULL,
  cache = TRUE
)
```

Arguments

`reporter`	Character. Reporter country ISO3 code.
`partner`	Character. Partner country code. Default `"0"` (World).
`service`	Character. EBOPS service code. Default `"TOTAL"`.
`flow`	Character. Trade flow: `"X"` (exports), `"M"` (imports). Can be a vector. Default `c("X", "M")`.
`year`	Integer. Year(s) to query (2000-present). Default: most recent available year.
`cache`	Logical. Cache results locally. Default `TRUE`.

Value

A data.frame with columns: reporter, reporter_desc, partner, partner_desc, flow, flow_desc, service_code, service_desc, year, trade_value_usd.

Examples

```
op <- options(comtrade.cache_dir = tempdir())

# UK services exports to the world
ct_services("GBR", year = 2022, flow = "X")

options(op)
```

ct_set_key *Set the Comtrade API Key*

Description

Store your UN Comtrade API key for the current session. The key is saved as an R option and optionally as an environment variable for persistence.

Usage

```
ct_set_key(key, install = FALSE)
```

Arguments

key	Character. Your Comtrade API subscription key.
install	Logical. If TRUE, also sets the COMTRADE_API_KEY environment variable via Sys.setenv(), which persists for the current R session. For permanent storage, add COMTRADE_API_KEY=your-key to your .Renviron file. Default FALSE.

Details

Get a free API key at https://comtradedeveloper.un.org/. The free tier allows 500 calls per day and up to 100,000 records per call.

Value

Invisibly returns the key.

Examples

```
ct_set_key("your-subscription-key-here")
```

ct_share *World Trade Share*

Description

Compute a country's share of world trade in a given commodity.

Usage

```
ct_share(reporter, commodity = "TOTAL", flow = "X", year = NULL, cache = TRUE)
```

Arguments

reporter	Character. Reporter country ISO3 code.
commodity	Character. Commodity code. Default "TOTAL".
flow	Character. "X" or "M". Default "X".
year	Integer. Year to query.
cache	Logical. Default TRUE.

Value

A data.frame with columns: commodity_code, reporter_value, world_value, share_pct.

Examples

```
op <- options(comtrade.cache_dir = tempdir())
ct_share("AUS", commodity = "2601", flow = "X", year = 2023)
options(op)
```

---

ct_top_partners *Top Trading Partners*

Description

Rank a country's trading partners by total trade value.

Usage

```
ct_top_partners(reporter, flow = "X", year = NULL, n = 20L, cache = TRUE)
```

Arguments

reporter	Character. Reporter country ISO3 code.
flow	Character. "X" for exports, "M" for imports. Default "X".
year	Integer. Year to query.
n	Integer. Number of top partners to return. Default 20.
cache	Logical. Default TRUE.

Value

A data.frame with columns: partner, partner_desc, value, share_pct, rank.

Examples

```
op <- options(comtrade.cache_dir = tempdir())
ct_top_partners("GBR", flow = "X", year = 2023)
options(op)
```

`ct_top_products` *Top Export or Import Products*

Description

Rank a country's traded products by value, showing the top N with percentage shares.

Usage

```
ct_top_products(
  reporter,
  flow = "X",
  year = NULL,
  n = 20L,
  level = 2L,
  cache = TRUE
)
```

Arguments

`reporter`	Character. Reporter country ISO3 code.
`flow`	Character. `"X"` for exports, `"M"` for imports.
`year`	Integer. Year to query.
`n`	Integer. Number of top products to return. Default 20.
`level`	Integer. HS digit level: 2, 4, or 6. Default 2.
`cache`	Logical. Default `TRUE`.

Value

A data.frame with columns: commodity_code, commodity_desc, value, share_pct, rank.

Examples

```
op <- options(comtrade.cache_dir = tempdir())
ct_top_products("AUS", flow = "X", year = 2023)
options(op)
```

`ct_trade` *Get Bilateral Trade Data*

Description

Download merchandise trade data from the UN Comtrade database. Returns bilateral trade flows between reporter and partner countries, optionally filtered by commodity code and trade flow direction.

Usage

```
ct_trade(
  reporter,
  partner = "0",
  commodity = "TOTAL",
  flow = c("X", "M"),
  year = NULL,
  frequency = "A",
  classification = "HS",
  cache = TRUE
)
```

Arguments

`reporter`	Character. Reporter country ISO3 code (e.g., `"GBR"`, `"USA"`, `"AUS"`) or numeric M49 code. Use `"all"` for all reporters (limited to 1 per query on the free tier).
`partner`	Character. Partner country ISO3 code, or `"0"` / `"W00"` for World (all partners aggregated). Default `"0"` (World).
`commodity`	Character. HS commodity code(s). `"TOTAL"` for aggregate trade, `"AG2"` for all 2-digit chapters, or specific codes like `"2709"` (crude petroleum). Default `"TOTAL"`.
`flow`	Character. Trade flow: `"X"` (exports), `"M"` (imports), `"RX"` (re-exports), `"RM"` (re-imports). Can be a vector for multiple flows. Default `c("X", "M")`.
`year`	Integer. Year(s) to query (1962-present). Can be a vector. Maximum 12-year span per query on the free tier. Default: most recent available year.
`frequency`	Character. `"A"` for annual (default), `"M"` for monthly.
`classification`	Character. Commodity classification system. Default `"HS"` (latest Harmonized System revision). See `ct_commodities()` for available classifications.
`cache`	Logical. Cache results locally for 24 hours. Default `TRUE`.

Value

A data.frame with columns:

reporter Reporter country code

reporter_desc Reporter country name

partner Partner country code

partner_desc Partner country name

flow Trade flow code (X, M, RX, RM)

flow_desc Trade flow description

commodity_code Commodity code

commodity_desc Commodity description

year Reference year

period Reference period (year or year-month)

trade_value_usd Trade value in US dollars

net_weight_kg Net weight in kilograms

quantity Quantity in supplementary units

quantity_unit Supplementary quantity unit

Examples

```
op <- options(comtrade.cache_dir = tempdir())

# UK total exports to the world, 2023
ct_trade("GBR", year = 2023, flow = "X")

# US imports of crude petroleum from Saudi Arabia
ct_trade("USA", partner = "SAU", commodity = "2709", flow = "M",
         year = 2020:2023)

# Australia's top-level trade with China
ct_trade("AUS", partner = "CHN", year = 2023)

options(op)
```

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