Autumn ACIS Fridays Training Session II

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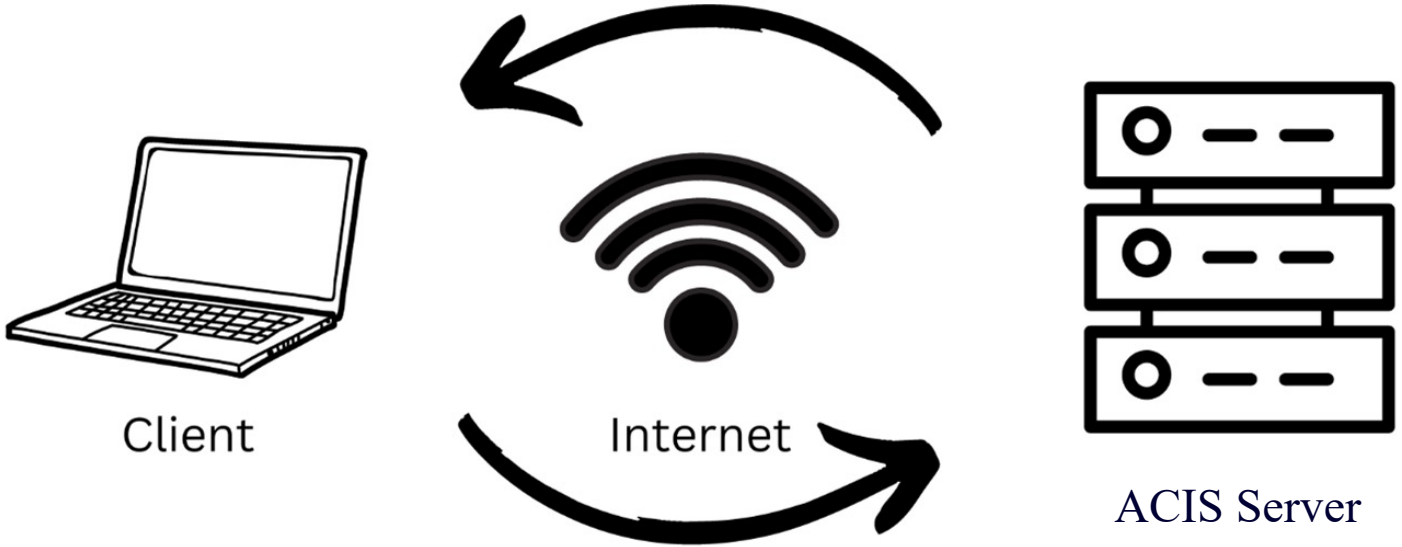
ACIS
Applied Climate Information System - Regional Climate Centers

ACIS Web Services Tools

- Documentation
  - https://www.rcc-acis.org/docs_webservices.html
  - All calls with examples and sample programs
- ACIS QueryBuilder
  - https://builder.rcc-acis.org
  - Teaching tool used in these training sessions
- Training Session Recordings
  - https://www.nrcc.cornell.edu/workshops/acis_training/acis_training.html

ACIS Web Services

JSON, CSV (limited), or PNG image (GridData)



StnMeta, StnData, MultiStnData, GridData parameters

ACIS Web Services Parameters

- JSON parameter objects
  - Key/value pairs
  - Quoted keys and values must be straight double quotes
  - No spaces in lists
  - Lists can be expressed as either ["ll","elev"] or "ll,elev"

ACIS Data Flags

Date	Precipitation
2011-01-01	0.00
2011-01-02	0.00
2011-01-03	0.00
2011-01-04	0.00
2011-01-05	T
2011-01-06	0.00
2011-01-07	0.05
2011-01-08	0.00
2011-01-09	0.00
2011-01-10	0.00
2011-01-11	0.00
2011-01-12	S
2011-01-13	0.07A
2011-01-14	T
2011-01-15	T
2011-01-16	M
2011-01-17	0.00
2011-01-18	0.03
2011-01-19	T
2011-01-20	0.01
2011-01-21	0.07
2011-01-22	0.00
2011-01-23	S
2011-01-24	0.02A
2011-01-25	T
2011-01-26	0.00

StnData Parameter JSON


```
{
   "sid":"kalb",
   "sdate":"2023-1",
   "edate":"2023-9",
   "meta":"[]",
   "elems":[
      {"name":"pcpn","interval":[0,1],"duration":1,
       "reduce":"sum","maxmissing":"1","smry":"sum"},
      {"name":"pcpn","interval":[0,1],"duration":1,
       "reduce":"sum","maxmissing":"1","smry":"sum","normal":"departure"}
   ]
}
```

Elements “interval” parameter

- Time step of results
- Array of length 1, 2 or 3 filled with zeros or a positive integer
- Length is temporal precision of returned values:
  - Length 1 = annual precision, e.g. [1]
  - Length 2 = monthly precision, e.g. [0,1]
  - Length 3 = daily precision, e.g. [0,0,1]
- Position of non-zero integer within the array signifies the time step of the values returned

Elements “interval” parameter

Interval	Explanation	Example
[0,0,1]	A daily value is returned for each day	
[0,1]	A monthly value is returned for each month	
[1]	An annual value is returned for each year	
[1,0,0]	A daily value is returned once/year	White Christmas
[0,1,0]	A daily value is returned once/month	15th day of each month
[0,0,7]	A daily value is return every seven days	Rainy Saturdays
[0,3,0]	A daily value is returned every third month	
[0,3]	A monthly value every third month	

Elements “duration” parameter

- Length of summarization period
- Integer in units specified by length of "interval"
  - e.g. interval=[0,1], duration=3
- "mtd", "ytd", "std" (requires "season_start")
- Everything except 1 day also requires "reduce"

Elements "interval/"duration" parameters

interval	duration	Explanation	Example
[0,0,1]	1	A daily value is returned for each day	Build to weekly
[0,0,7]	2	A 2-day value is return every seven days	Rainy weekends
[0,3]	3	A 3-month value is returned every third month	Seasonal summaries
[1,0]	8	An 8-month value is returned every year	Seasonal snowfall
[10]	30	A 30-year value is returned every 10 years	30-year averages

Elements "interval/"duration" parameters

interval	duration	Explanation	Example
[1,0,0]	mtd	The month-to-date value is returned for every year	Month-to-date example
[0,0,1]	ytd	A year-to-date value is returned every day	Accumulated precipitation
[0,0,7]	std	A season-to-date value is returned every 7 days (specify season_start)	Seasonal GDD by week

Elements “reduce” parameter

- Basic summary:

```
reduce: "sum"
```

- Number of values can be returned (e.g. top 10):

```
reduce: {"reduce":"max","n":10}
```

- Additional information can be returned:

```
reduce:{"reduce":"sum","add":"mcnt"}
```

Code	Description
max	Maximum value for the period
min	Minimum value for the period
sum	Sum of the values for the period
mean	Average of the values for the period
list	Array of the values for the period
cnt_xx_yyy	Count of number of values passing threshold
pct_xx_yyy	Percent (integer) of values passing threshold
fct_xx_yyy	Fraction (float) of values passing threshold
first_xx_yyy	First occurrence of value passing threshold
last_xx_yyy	Last occurrence of value passing threshold
run_xx_yyy	Consecutive values passing threshold

Code	Description
mcnt	Count of missing values in the reduction period
date	Date of occurrence (for max, min, run)
value	Value on date of occurrence (for first and last)
rmcnt	Count of missing values in the run period (run only)

Elements "reduce" parameter

interval	duration	reduce	Example
[1,0,0]	std	{"reduce":"sum","add":"mcnt"}	Seasonal snowfall
[1,0,0]	std	{"reduce":"max","n":"10"}	10 snowiest days
[1,0,0]	std	{"reduce":"cnt_le_32"} {"reduce":"pct_le_32"} {"reduce":"run_le_32"}	Counts, percent, and runs of days <= 32 degrees
[1,0,0]	std	{"reduce":"first_le_32","add":"value"}	Fall freezes

Questions