# I/O analysis of climate applications

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# Content (Agenda)

# Introduction

- Why we use models
  - simulations
  - another part of nowadays research

- Climate applications
  - about the I/O
  - analysis
  - different Models
  - visualisation

# Motivation

- models need huge amounts of data
- data storage is limited and expensive
- analyse models and evaluate needed data
- prune as much data as possible

# What are models

- Climate Models
    - a representation of climate
    - ocean, ice, land, river, vegetation
    - predict future climate
    - global scale
- Atmospherical model
    - numerical weather prediction
    - predict weather in a foreseeable period

# Structure of the data

- numeric data
- scalar quantities
- vectors
- grid data

# Most important formats used for climate applications

- netCDF
- HDF5
- since version 4 netCDF is embedded in HDF5



Figure: hdf-logo [**?**]



Figure: netcdf-logo [**?**]

# The model landscape

- large choice
- old models
- poorly documented
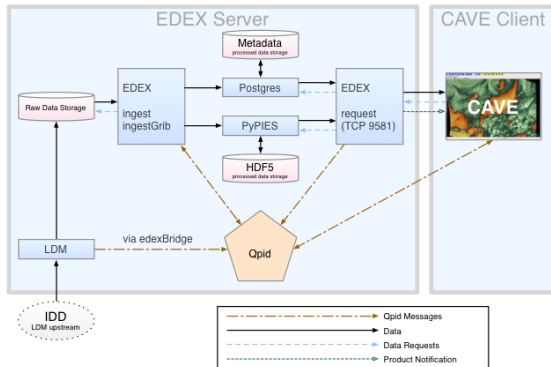- nearly no open source
- example IFS

# Awips II



Figure: Awips Infrastructure [?]

# Awips II

- forecast display and analysis
- provides EDEX to store computed data [**?**]
    - HDF5 Storage
    - custom python libraries for storage management
    - PostgreSQL for metadata management and storage
- Provides CAVE to display data
    - program to connect with EDEX server
    - select data set, download and view it on your local machine

# CESM

- community Earth System Model
- model for global climate simulation
- covers atmosphere, land, land ice, sea ice, ocean and river
- provides scripts for setting up the machine in 4 commands
    - scripts are broken
    - mix of bash, csh, perl
- good configurability with xml files
- requires netCDF format for input data [**?**]

# Summary

- Data
  - hdf5 , netCDF
- Models
  - CESM
  - EcoHam
- Analyzer
  - awips2

# Sources I