



# **Survey of Environmental Data Portals and Reliability Issues**

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February 2, 2010

# What is a Data Portal?

- Presents information from diverse sources in a unified way
- Enables instant, reliable and secure exchange of information over the Web
- The "portal" concept is to offer a single web page that aggregates content from several systems or servers.

# Types of Data Portals

- Commercial— contains basic information for a general audience, including current events information
- Academic – typically includes scientific data (ex. research articles, etc.)
- Also Community and Enterprise Portals

# Examples of Data Portals

- California Climate Change Portal (community)
- UN Climate Change Portal (community)
- EPA Climate Change Portal (enterprise)
- Tiempo Climate Change Portal (academic)
- SPREP Climate Change Portal (academic)
- Climate Ark Portal (community)

## ]

# SPREP Climate Change Portal



**Pacific Regional Environment Programme**



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**Climate Change Portal**

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**Climate Change, Climate Variability and Sea Level Rise**

The Intergovernmental Panel on Climate Change (IPCC) continues to report that expected climatic changes over the region will stimulate an increase in extreme weather events that include; higher maximum temperatures, increased number of hot days, more intense rainfall over some areas and an increased frequency and severity of tropical cyclones.

The international community has initiated steps under the United Nations Framework Convention on Climate Change (UNFCCC) to stabilize greenhouse gases in the atmosphere and promoted carbon trading to assist with this overall objective under its Kyoto Protocol. However progress has been slow. While the global commitment needed to stabilise greenhouse gases has not been evident in the climate change convention negotiations, good progress has been made to reduce ozone-depleting substances.

In 2003, mainstreaming climate change into development plans assumed much importance. It was highlighted at the World Summit on Sustainable Development (WSSD), the Delhi Declaration of the 8th Conference of the Parties to the UNFCCC and in the latest Global environment Facility (GEF) Council Guidance especially in relation to adaptation. Multilateral and bilateral donors also require mainstreaming to be shown as a precondition to assistance. While funding for Adaptation under

**2009 Pacific Year of Climate Change**



[Click here.](#)

**Pacific Adaptation to Climate Change**



[Click here.](#)

**Climate Change**

Done

# Climate Ark Portal

The screenshot shows the Climate Ark website with a header banner featuring various environmental images and logos. The main navigation bar includes the site title, a search bar, and links to different sections. The content area is divided into several columns: a news feed on the left, a central blog section with featured articles, and a right sidebar with social network and alert information. The footer is minimal, showing a 'Done' button.

**Climate Ark**  
Climate Change and Global Warming Portal  
Featuring Customized Search and News Feed of Reviewed, Authoritative Content

**Climate Change Search**  
Search Internet Here   
☒ Internet ☐ News ☐ Links ☐ Site

**Climate Change News Feed**  
Archive Updated Continuously  
Highlights   
31/1 - [One slip does not change the big picture](#), Times of India [\[search\]](#)  
30/1 - [California: Cleantech: Silicon Valley's next great wave of innovation](#), San Jose Mercury News [\[search\]](#)  
30/1 - [Pentagon review to address climate change for the first time](#), The Hill [\[search\]](#)  
30/1 - [Bulgaria's 'green' energy boom sparks fears](#), Independent (UK) [\[search\]](#)  
30/1 - [As carmakers plug 'green,'](#)

**Climate Destruction > Take Action!**

**Protect Climate > Donate Here!**

**Climate Change Blog**  
Biocentric Commentary Emphasizing Abrupt Climate Change, Ending Terrestrial Ecosystem Loss, and Other Sufficient Ecological Responses  
**ALERT! Protest Madagascar's Legalization of Rosewood Log Export from Protected National Parks**  
**TAKE ACTION!** Delmas shipping, a subsidiary of French shipping giant CMA-CGM, is being pressured by the transitional Madagascar government to ship hundreds of containers of illegally logged ancient rainforest logs from Madagascar to China anytime soon. Post-coup illegal log and wildlife trade continues to threaten Madagascar's biodiversity.

**My.EcoEarth.Info**  
Climate Change Social Network  
Email:   
Password:

**Climate Alerts**  
**Protest Madagascar's Legalization of Rosewood Log Export from National Parks**

**Write for EI**  
Write climate essays and guest blogs for Earth's team

**Climate Overview**  
Graphs and charts presenting

Done

# Reliability Issues

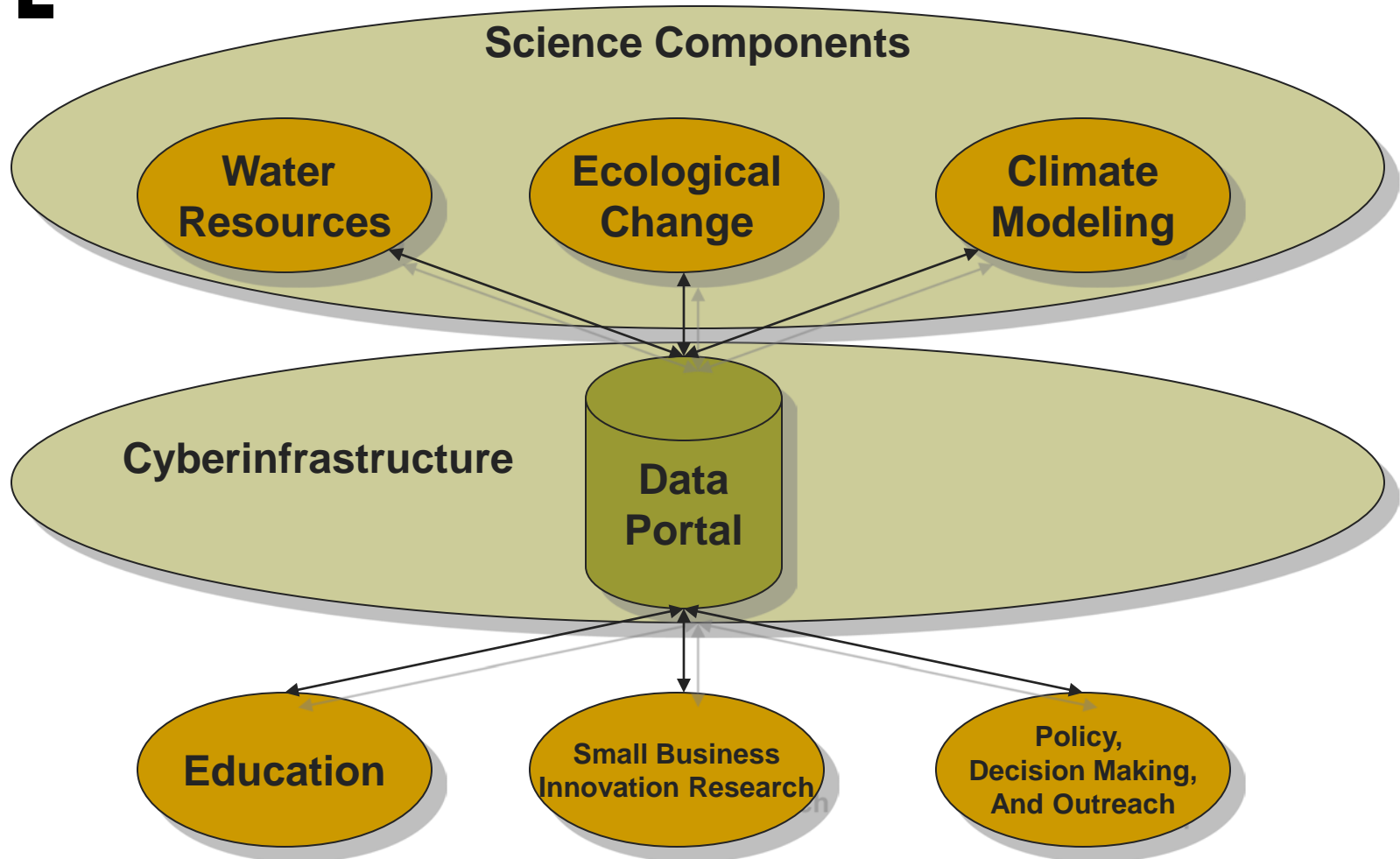
Why?

- Portal needs to be operational.
- Portal needs to be resilient to changes.
- Data must be authentic.
- New applications are integrated into the portal.

Note. Reliability vs. Availability



# Priorities, Sensitive Data



# [ How to Achieve Reliability? ]

## Data Portal Components

- A data base
- Communication links
- A computing cluster
- Web-based application software

# [ Redundancy (H/W, S/W, Info.) ]

- Redundancy at main failure points

Typically, these failure points are:

- Network Switching Devices
- Application Web Servers
- Database
- Executable Code Repository

# [ Network Switching Device ]

- First entry point to the portal architecture
- Hardware Switches
  - Active/Standby Capability

# Application/Web Servers

- The core processing of the portal
- Can be configured in a cluster
- Servers configured identically and run application software

# Database

- Use a standby database
  - All the transactions that occur on the master database are run on the standby in real-time.

# [ Executable Code Repository ]

- Codes can be run on servers that are physically separated.

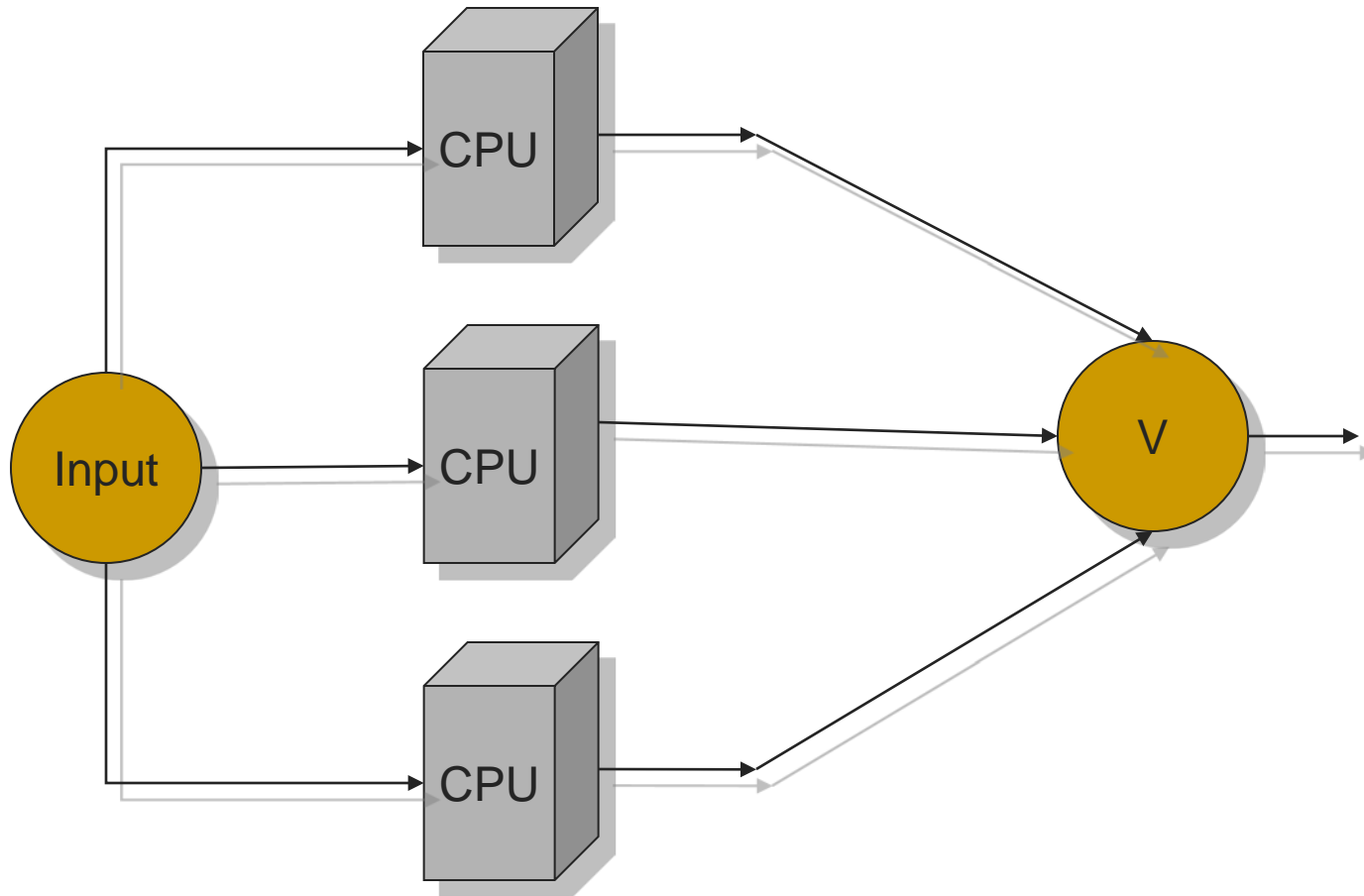
Caveat. A “common mode” software bug can bring the system down.

# Hardware Vs. Software Redundancy

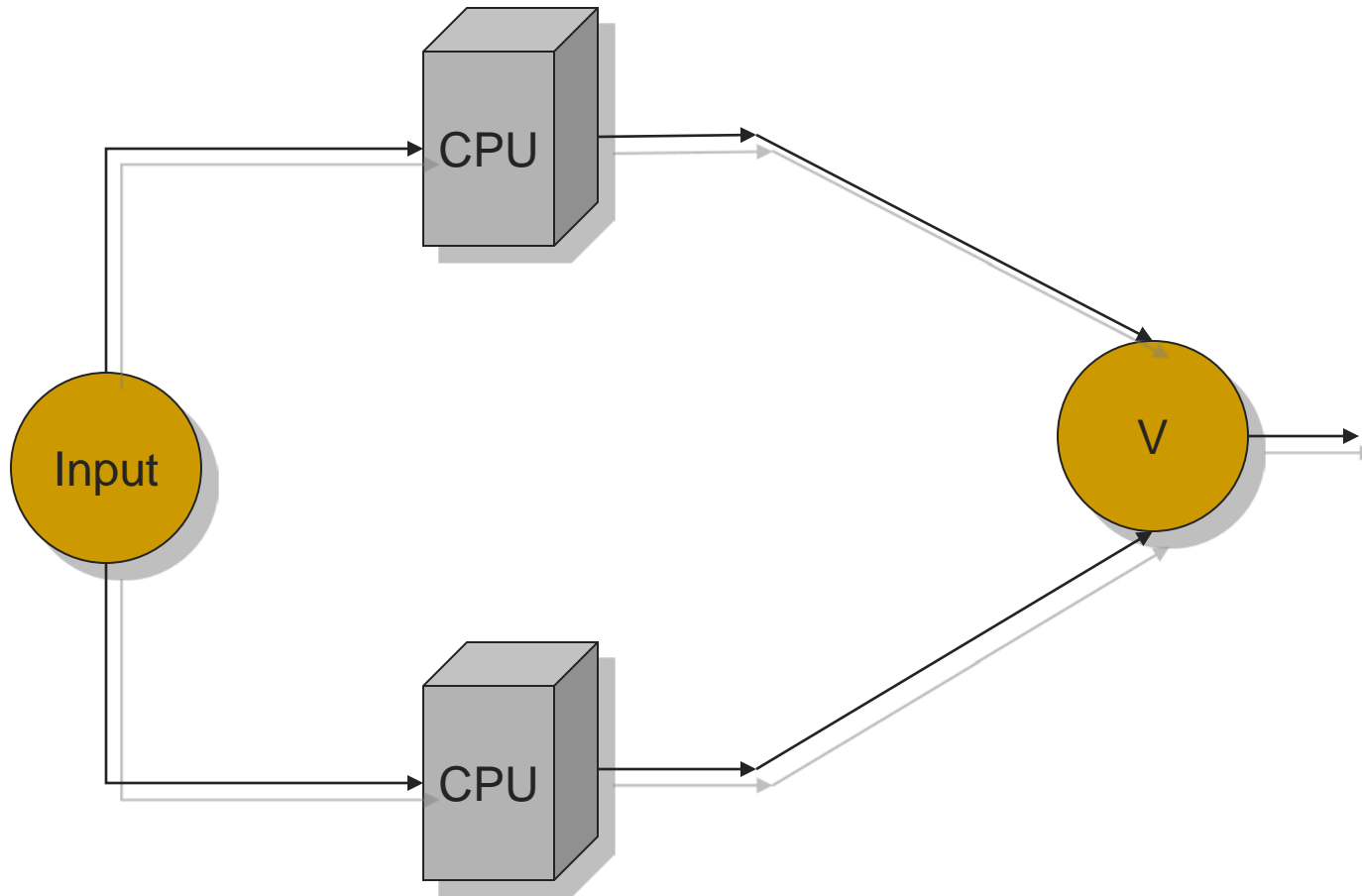
- Hardware Redundancy
  - TMR (Triple Modular Redundancy)
    - System is operational as long as at least two outputs match.



# TMR H/W

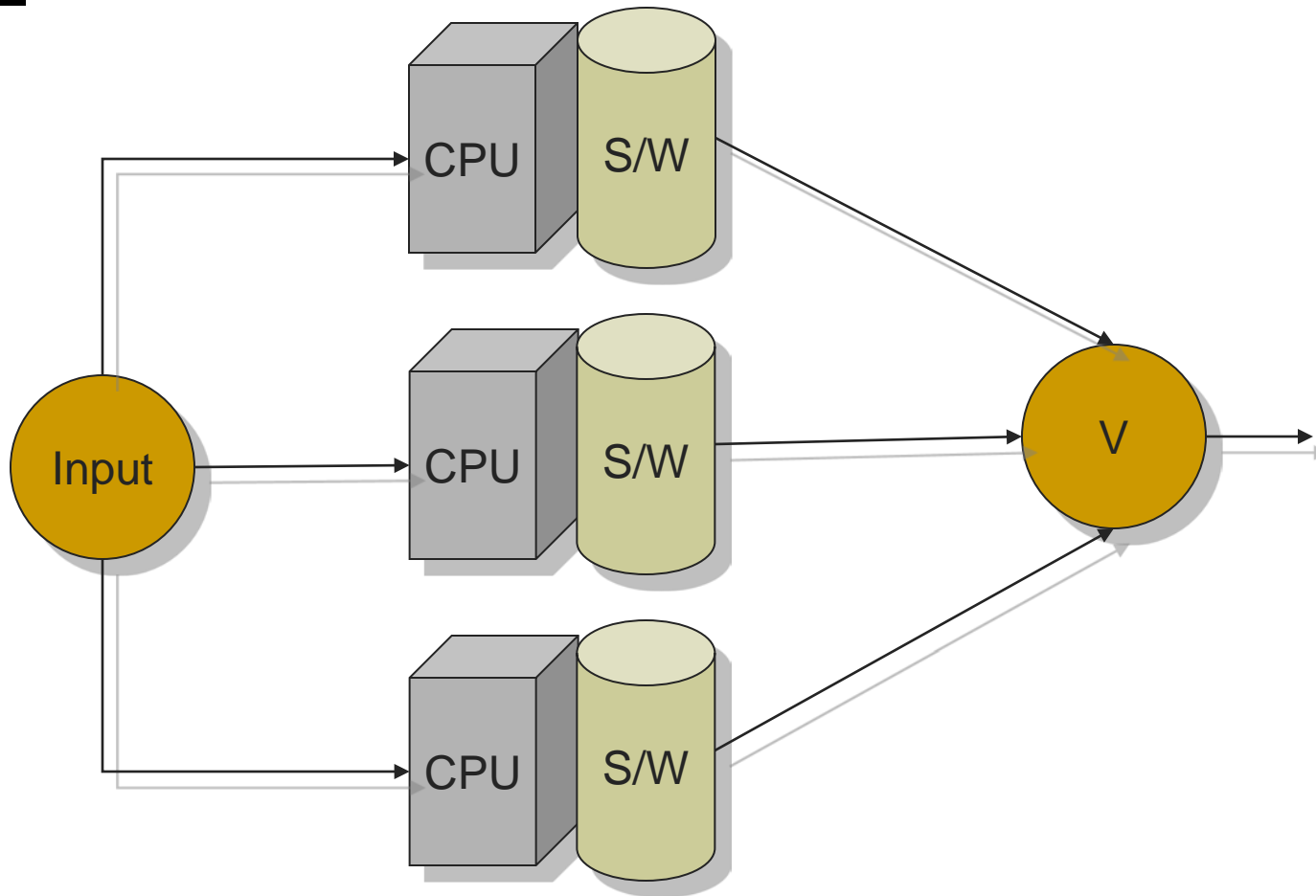


# TMR H/W (after one failure)



# A TMR System

## Does it really Work?



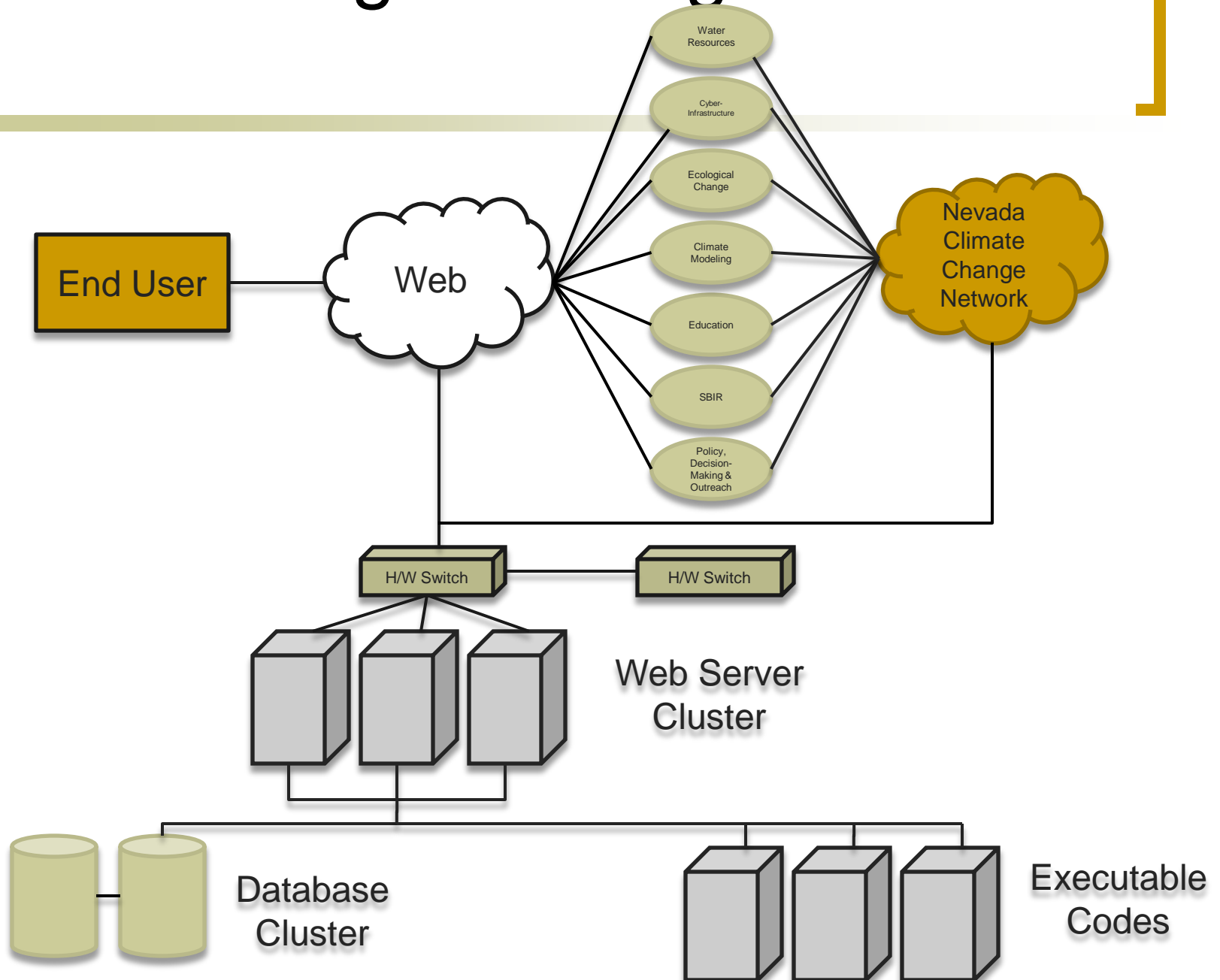
# Software Reliability

- Fallacy 1- The outcome of a computer program is a deterministic rather than a probabilistic event.
- Fallacy 2. Instructions do not wear out; software cannot fail.

# Information Redundancy

- Data Integrity
  - Use known Error Detection/Correction Codes

# Putting it All Together



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