Software Best Practices Clearinghouse

Promoting Adoption and Effective Implementation

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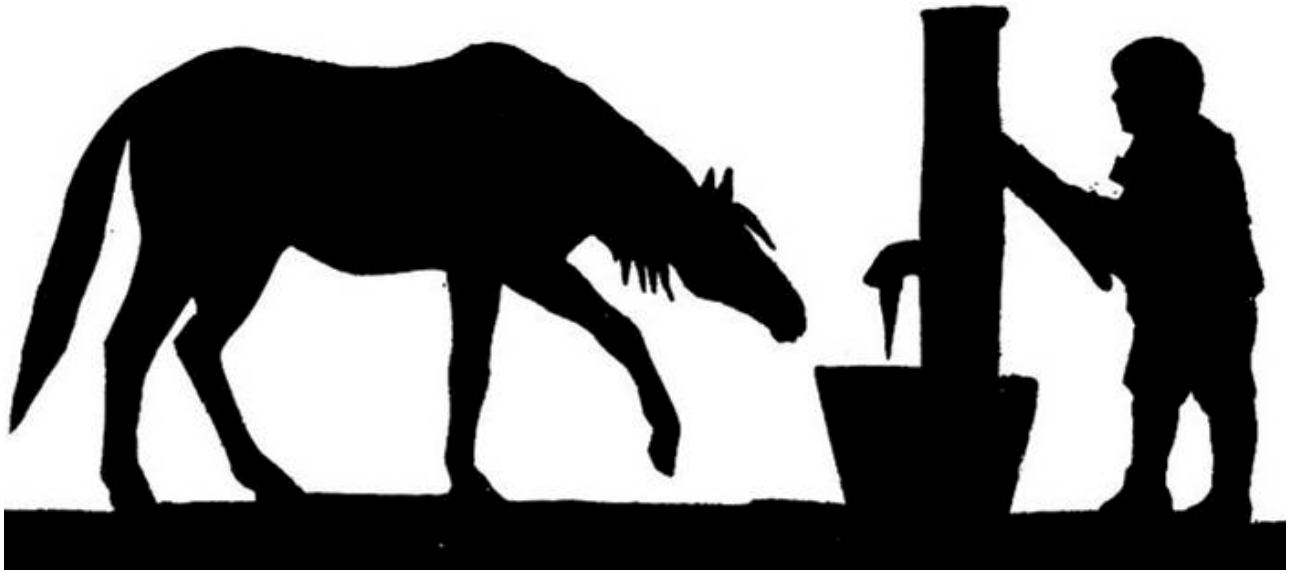
Presentation Objectives

- **Share** with you our thinking on why we believe programs face challenges implementing best practices and how we overcome those challenges
- **Inform** you about the Best Practices Clearinghouse Initiative
- **Encourage** you to think about your experiences with considering or implementing best practices
- **Request** your feedback and motivate you to get involved

How Do We Encourage Broader Use of Best Practices?



- Through the Best Practices Clearinghouse
  - Promote and assist in the adoption and effective utilization of "best practices"
  - Provide central access to validated, actionable practice information
  - Target the needs of the Department of Defense software acquisition and development community

Implementation Barriers

- **Programs are aware of "best practices," but they don't often choose to implement them**
  - **Too many lists to choose from**
  - **No basis for selecting specific practices**
  - **Proof of effectiveness is not generally available**
  - **Not easy to see connection between practices and specific program risks or issues**
  - **Practice's success factors not well understood**
  - **Resources are limited and the return on practice investment is unknown**
  - **Implementation guidance is inadequate**

Traditional Best Practices

- Are disciplines rather than specific practices (e.g., Risk Management)
- Have problematic descriptions
  - If descriptions too generic or abstract, hard to apply; if too context specific, don't seem relevant
  - Implementation directions insufficient, ineffective, imprecise
  - Rarely supported by data
- Take energy and resources to implement, but benefits may come (much) later or are hard to quantify
- Implementation does not always work
  - Often depend on other practices
  - Are not implemented as designed
  - Depend on project context (size, complexity, life-cycle phase)

What Do We Mean By 'Supported By Data'?

- **Example: NASA Software Engineering Laboratory Ground Support Systems Software Development**
  - **Used experiments and data to evaluate, select, implement and track the impact of development practices**
  - **By feeding back actual performance data into their work, and using only practices their data showed effective, they:**

Decreased Development Defect rates by
75% (1987 - 1991) **37%** (1991 - 1995)

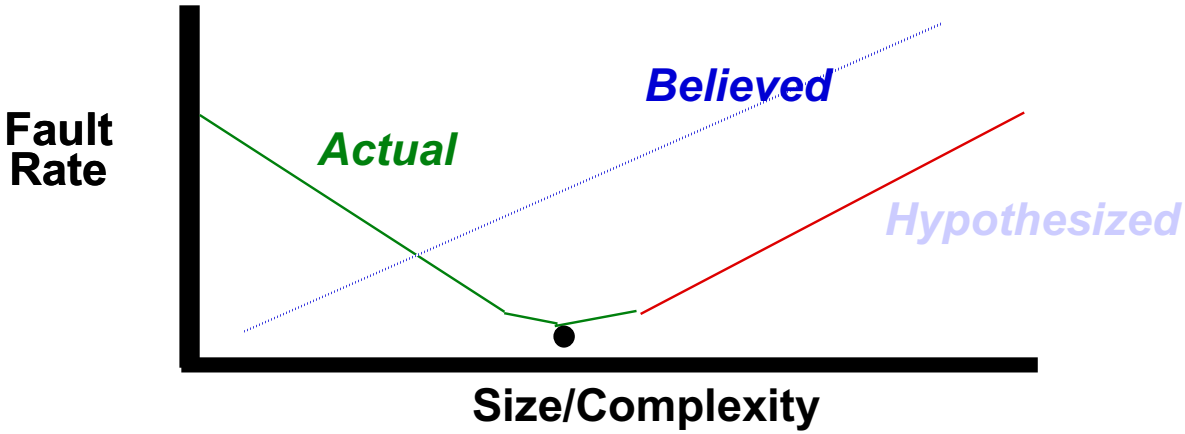
Reduced Cost by
55% (1987 - 1991) **42%** (1991 - 1995)

Improved Reuse by
300% (1987 - 1991) **8%** (1991 - 1995)

Increased Functionality five-fold (1976 - 1992)

Practice Analysis Examples

- **Best practice: Smaller modules have less defects**
  - **Reality: Observation and analysis showed sweet spot**



- **Best Practice: Early detection of defects**
  - **Initial experience: late detection >100X more expensive**
  - **New data showed**
    - **100X still valid for severe defects**
    - **However, only 2X more expensive for less severe defects**
    - **Business model drives acceptance of late costs**

The Clearinghouse Vision

- *The* best practice resource for the Department of Defense
- Based on empirical evidence
- Validated practice information provides level of confidence
- Leverages existing best practices and centralizes access to them
- Captures cost, benefits, context, latency
- Supports user-driven selection of relevant practices
- Provides step-wise implementation guidance and expert assistance
- Tracks and measures results

Key Strategies to Overcome Challenges

- User-focused access and information infrastructure
- Empirically based Information in the repository
- The building block of each practice or set of practices is a "story"
- A set of stories are synthesized into a profile
- Details of the practice are provided on demand
- A type of color code scheme provides a quick and easy way of understanding the level at which the practice is well-proven or robust

Delivery Infrastructure Focused on Users

- **Easy to use, informative tools for best practices selection and implementation support**
  - **Practices suggested by goal, risk, phase, program size**
  - **Implementation ordering for multiple practices**
  - **Evolution from basic through advanced practices**
  - **Flexible search mechanisms**
- **Active community involvement and links to expertise**
  - **Acquisition Community Connection (nee PM CoP)**
- **Dissemination of Clearinghouse latest information through widely-used venues: courses, workshops, articles, conference tutorials**

Exploiting Sources of Information

- **Identify and utilize what we already know**
  - Mine best practices and lessons learned repositories (from the Services, Agencies, FFRDCs, DAU, Academic Institutions, DACS Gold Practices, Industry, literature, etc.)
  - Cultivate relationships with practice experts and researchers
  - Gather experiences on specific programs
- **Make it readily accessible**
  - One central entry point to organized information
  - Not re-publish what is already there, but provide links
- **Make it easy to use**
  - Extract key information from more detailed sources
  - Provide visual cues and progressively more detailed information
- **Keep it current**
  - E-workshops support practice identification and validation
  - User feedback
  - Ongoing study, conferences, workshops, symposia

Best Practices Vetting Process

Each cycle allows more experience to be gathered and processed, leading to better characterization of the practice, improved recommendations, and more dependable implementation guidance.

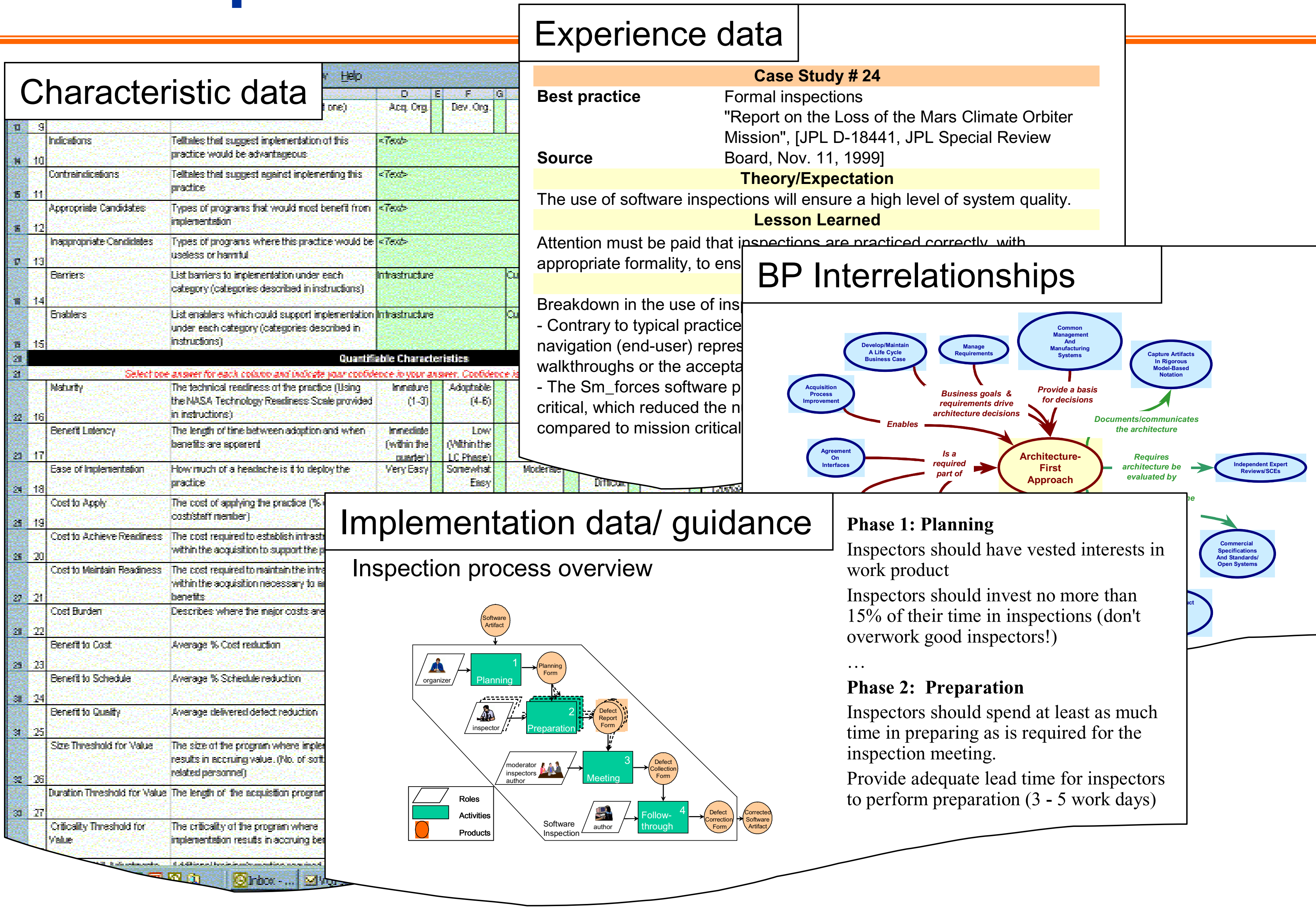
Practice/packaging maturation cycle

Identification	Characterization	Analysis & Synthesis	Validation	Packaging &Dissemination
Inputs: Leads to practices **Activities:** •Collect •Categorize •Filter •Synthesize •Prioritize **Outputs:** Candidate set of practices	**Inputs:** Set of candidate practices and rationale for consideration **Activities:** •Gather/research characteristics about the practice including context (project, etc.), evidence of use, lessons learned •Complete "story" profile **Outputs:** More detailed set of candidate practices with "stories"	**Inputs:** Detailed set of candidate practices **Activities:** •Aggregate stories, create profile of practice •Populate the repository •Identify/define Interrelationships **Outputs:** Single profile for each best practice, associated artifacts, and confidence levels	**Inputs:** Sets of practice data; validation criteria **Activities:** •Check outputs from previous phases •Color Code practices •Approve practices via panel of experts **Outputs:** Validated practices	**Inputs:** Sets of practice data; validation criteria **Activities:** •Packaging •Publishing •Promoting •Providing user help •Discussions **Outputs:** •Repository update •Papers & conference presentations •Course materials/updates

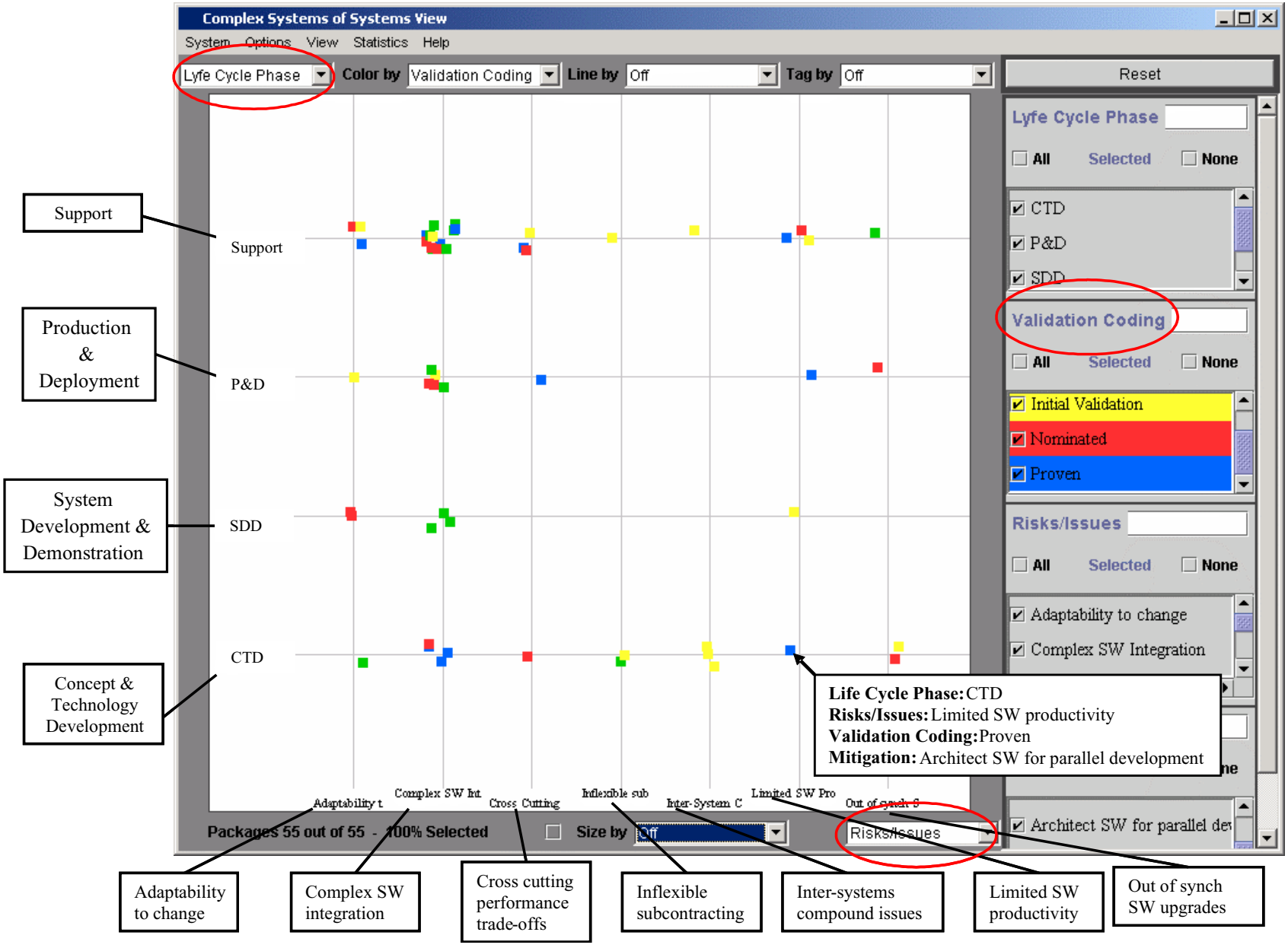
Proven
Consistent results
Initial validation
Nominated

Possible practice validation coding

Conceptual BP Information



Example Tool for Practice Selection & Investigation



DACS Gold Practices

- Initiative began in early-2002, extending previous best practice research
- Objectives:
  - Disseminate consistent, easy-to-understand, value-added best practice information
  - Gather user experience on best practice information
- 35 practices identified; 4 currently described
- Relationship to Clearinghouse
  - Initial information source for Clearinghouse
  - Clearinghouse activities will inform and improve Gold Practice products

How Can You Get Involved?

- **Let us know your needs by**
  - **Identifying your best practices lists and sources of guidance for their use**
  - **Sharing your experiences & lessons learned in implementing best practices**
  - **Volunteering to help us define the services and capabilities of the Clearinghouse**
  - **Participating in surveys, e-workshops and other events - See http://iac.dtic.mil/dacs for more information**
- **Participate in the next session, "Software Acquisition Best Practices Workshop"**

The Best Practices Clearinghouse – In Summary

- Centralized resource
- Lessons learned in application of practices
- Empirically based, Experiences provided
- Acquisition and development practices
- Repository of vetted practices
- Important insight
- Not just another list; Not just a website
- Guidance on selection
- Help provided through multiple services
- Outreach to user community
- Useful information
- Search capabilities
- Easy to use & informative tools

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