



# **RES*check*-Web & COM*check*-Web**

## **Web-based energy code compliance**

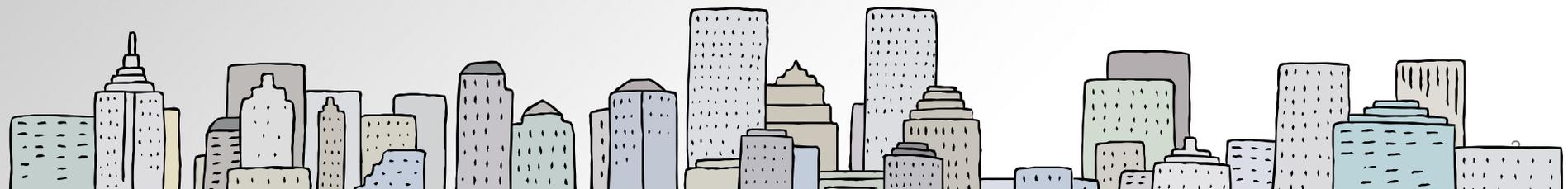
**Geoffrey Elliott, PNNL**



# Building Energy Codes Program

## Our Goal –

- To improve energy efficiency of the Nation's buildings by promoting the upgrade, adoption, and implementation of stronger building energy codes.
  - Improve energy codes to make way for new technologies and better practices
  - Help states easily adopt, implement, and enforce improved codes





# Code Compliance Software

- Free (as in beer) software for builders
  - REScheck – Residential
  - COMcheck – Commercial
  
- Support for national, international, and state-specific energy codes
  
- Desktop and web-based tools
  - Web-based also includes prescriptive package-based approach



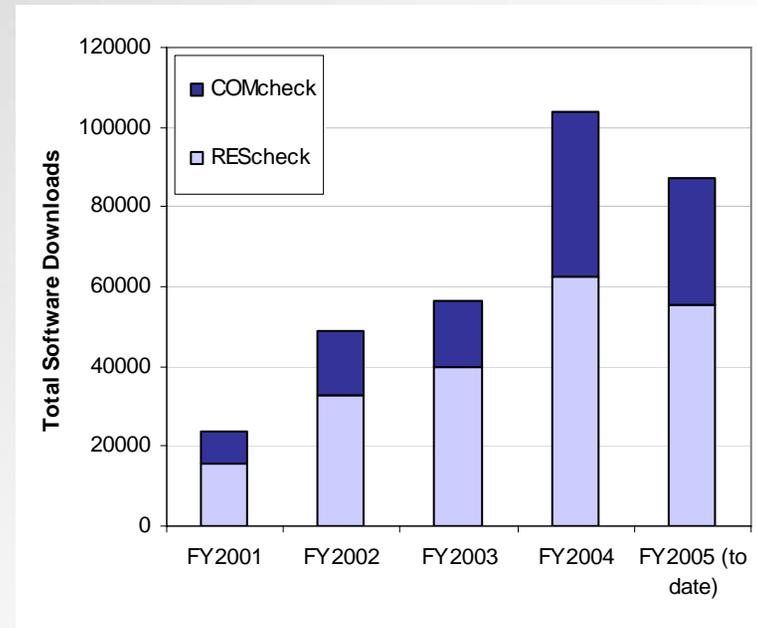
# Desktop Software

## ➤ Existing since mid-1990s

- Provides a simple user interface to analyze compliance options to demonstrate compliance with multiple energy codes.
- Mandated by some jurisdictions in code adoptions
- Provides flexibility and focuses on enforceability.

## ➤ Leveraging Technology

- Java Swing allows support for multiple operating systems (Mac OS X, Linux)

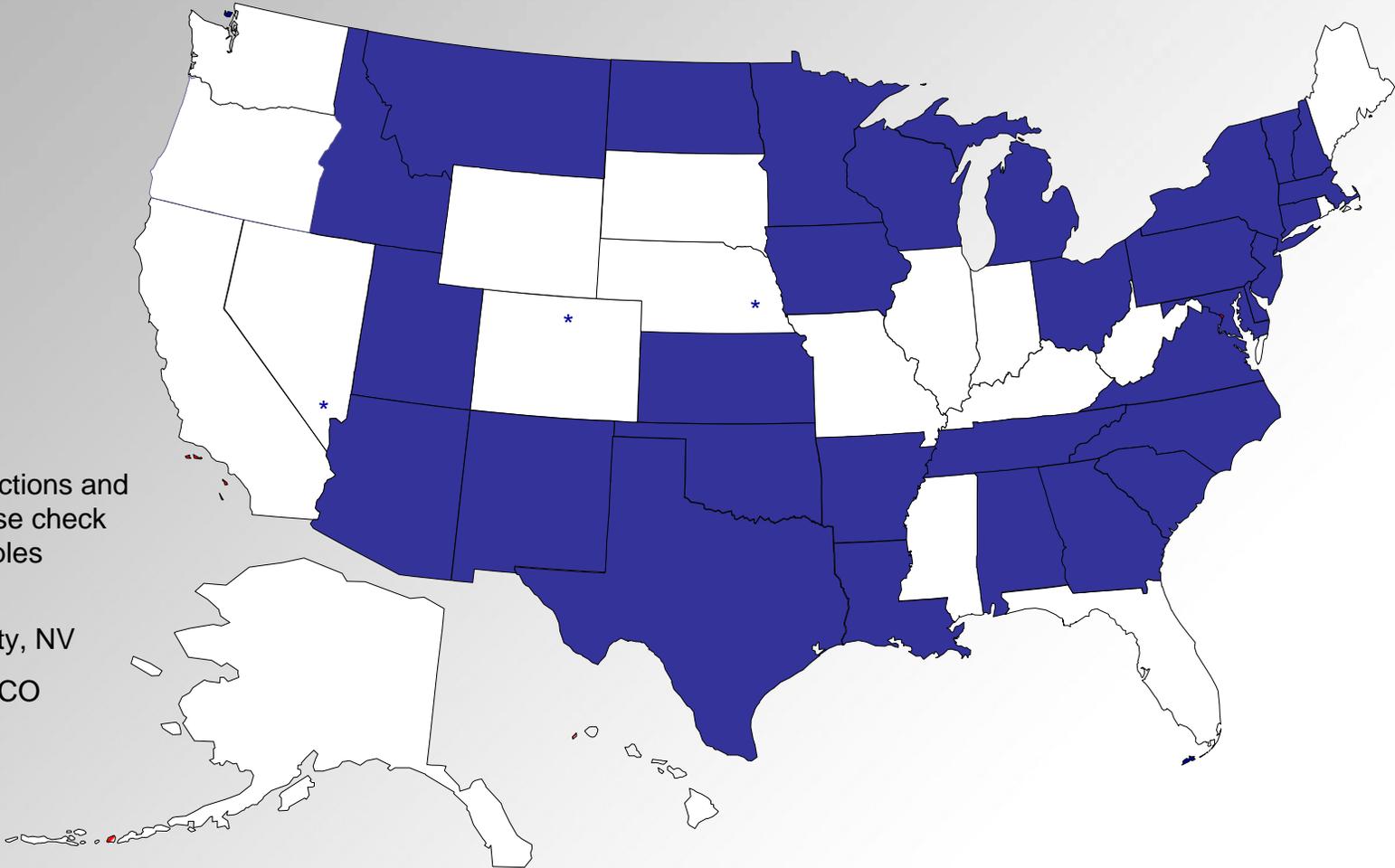




# Demo



# States That Use REScheck

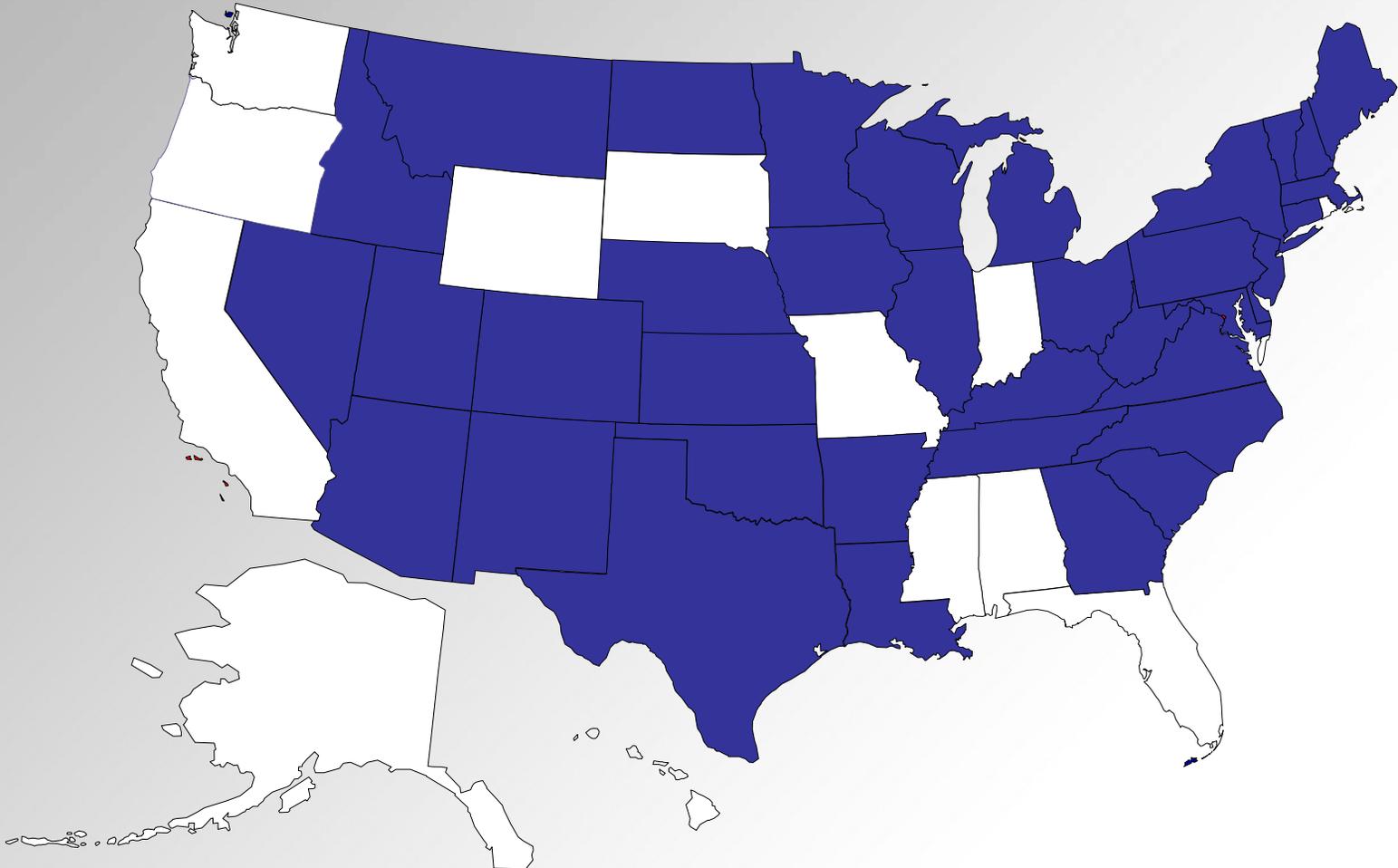


Other jurisdictions and cities also use check tools, examples include:

- Clark County, NV
- Ft. Collins, CO
- Lincoln, NE



# States That Use COMcheck





# Web-based Software

## ➤ Four web tools in 2005

- Prescriptive and trade-off tools available
- Provides users access from any location
- No download required
- Opportunity for data gathering without infringing on privacy
- Updates are provided to users immediately
- Integration with other online tools (website/Resource Center)

## ➤ Leveraging Technology

- Java applications running the common code engine
- Tomcat servlet based
- Heavy client-side DOM usage within GUI



## Adaptation for the Web

- Compliance checks not continuous
  - User-initiated server call/response process
- User registration required to save/load projects
- GUI differences
  - Compensate for different widget sets
  - Be sure user knows the app is not native
  - Brand to match other Building Energy Codes Program materials



# Demo



## REScheck-Web Timeline

- Version 1.0 - Spring 2003
  - Support for a few national and international codes
  - Somewhat proof-of-concept
  
- Version 1.1 – Fall 2003
  - Support for state codes
  
- Version 2.0 – Fall 2004
  - Shared generic CSS and Javascript
  - Online Permitting
  
- Version 2.1 – Fall 2005
  - New code/assembly support
  - Beyond the Code Advisor



# Online Permitting

## ➤ Implemented on all desktop and web tools

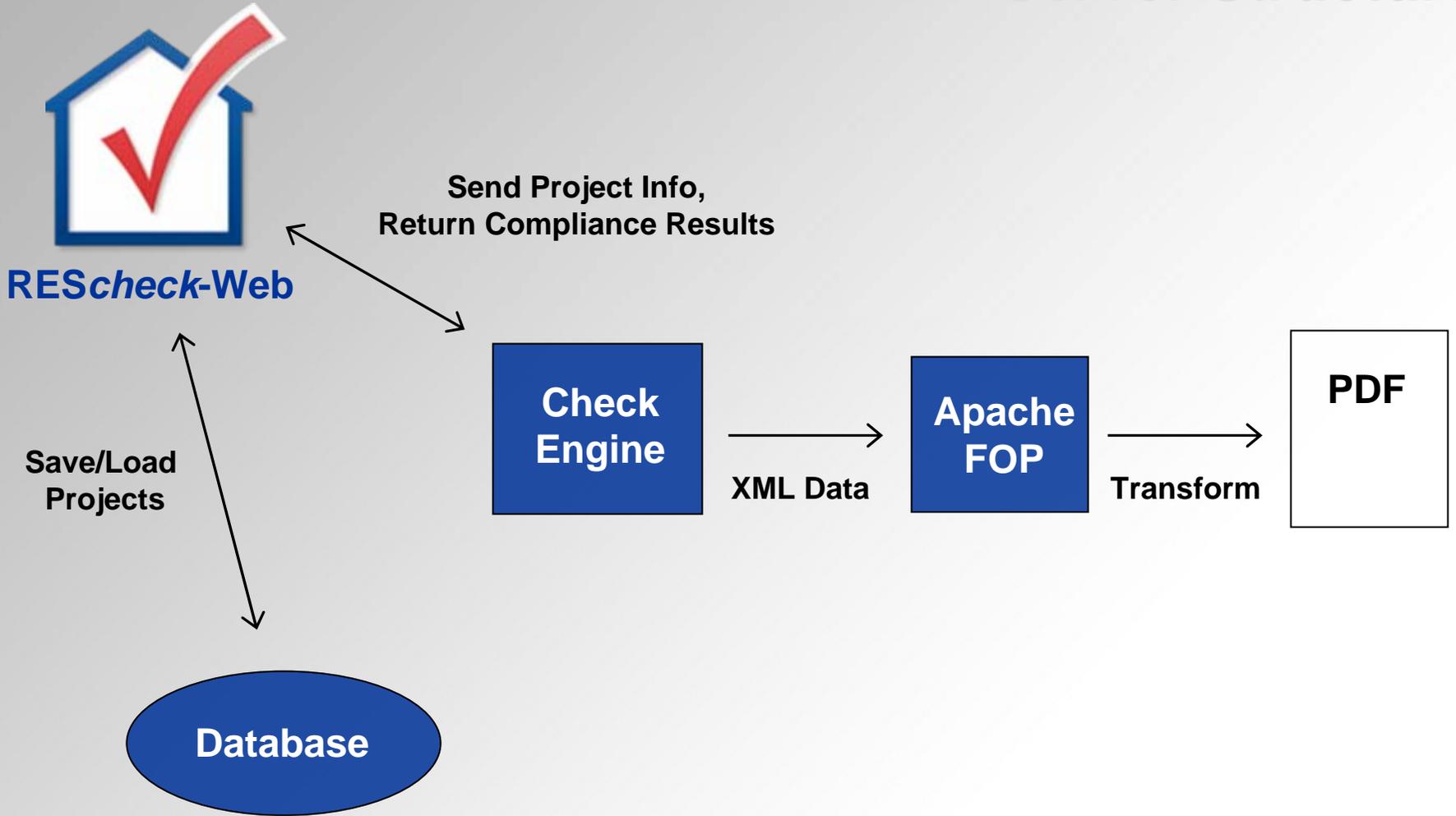
- Compliance can be 100% digital
- Allows jurisdictions to easily collect reports and data
- Users avoid trips to the office

## ➤ Leveraging Technology

- XML is used to generate the pdf compliance reports
- Compliance data (as XML) can be distributed via email for a jurisdiction database (user requested)
- Digital signatures and PDAs are on the horizon



# Server Structure





# Client-side Architecture

Page-specific  
methods, column  
positioning

envelope.js/.css

lighting.js/.css

mechanical.js/.css

help.js/.css

Element creation  
& draw methods,  
row style

component\_table.js/.css

dialog.js/.css

Cross-application  
colors, fonts, sizes,  
methods

generic.js/.css



## Future Work (FY06) – XML-based Engine

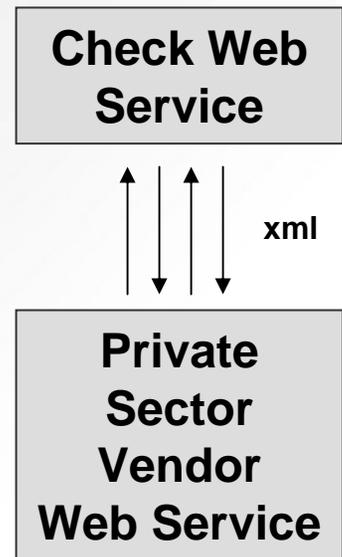
- Store projects as XML – allows for transferring files between desktop and web apps
- AJAX opportunities
  - Continuous compliance checks
  - No more reloading frames, handle data save/load in background
- Better possibilities for interaction with private sector tools
  - Load/Save AutoCAD files



# Future Work (FY06) – Web Services

## ➤ Passive “*check*” web service

- Implement interaction with private sector vendors specifically as part of the NCSBCS committee
- Later .... Integrate closely with other private sector vendors
  - HVAC sizing software
  - Cost estimation software
  - AutoCAD software



## ➤ Leveraging Technology

- PNNL existing expertise in web services
- Extensive security and server infrastructure make development easy



## Future Work (Farther out)

- Palm based compliance for every code official in the field
- Instant transmission of digital code information, documentation and compliance
- Integrated web-based systems allow jurisdictions to consolidate services (mechanical, electrical, building, plumbing, energy)

Cost  
Reductions



# Software Summary

## ➤ Web-based applications

- REScheck-Web
- COMcheck-Web
- RES/COM-Package Generator

10,400 registered users	Average 3,000 visits per month
	Average 1,200 visits per month
	Average 2,000 visits per month

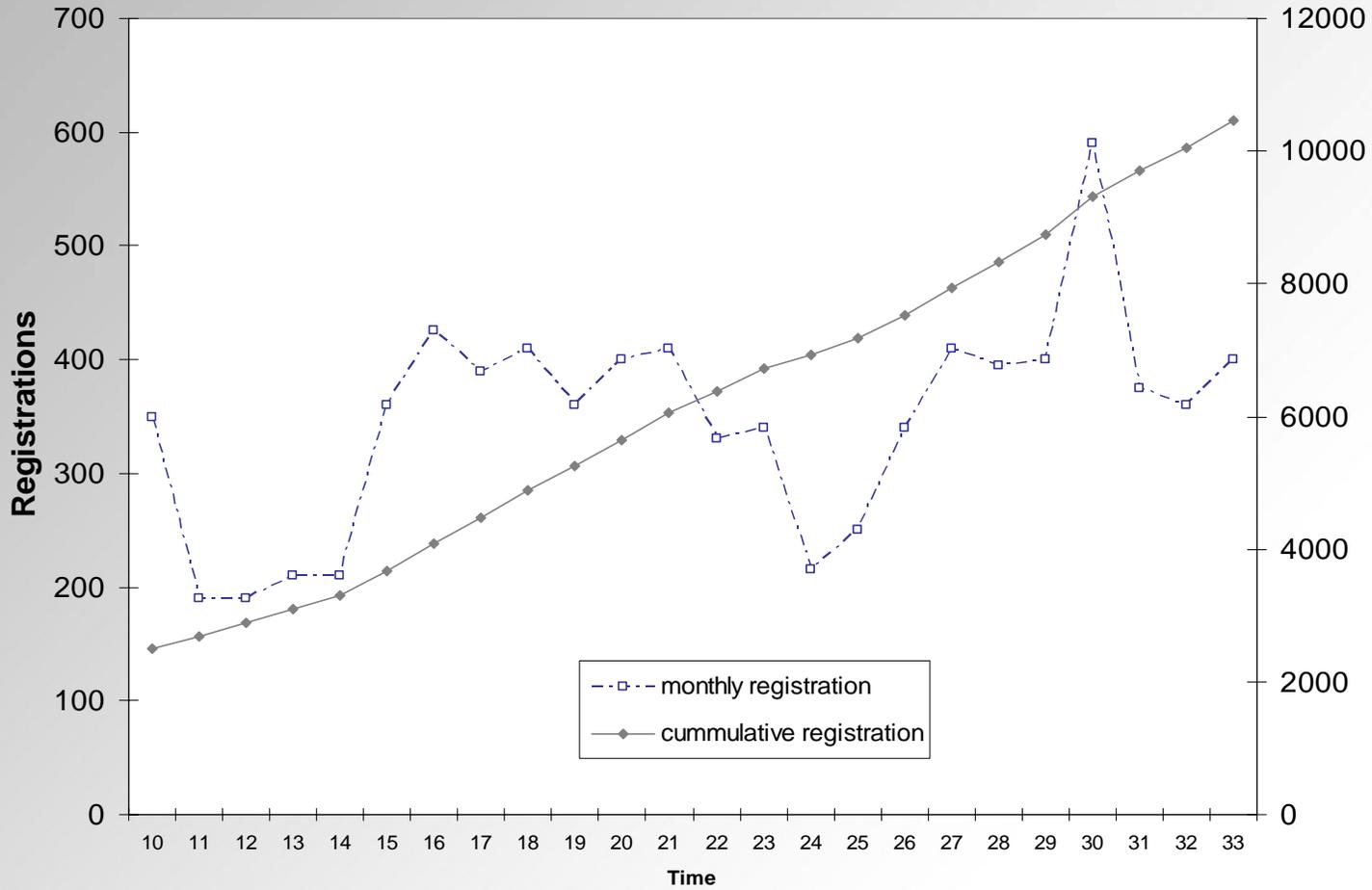
## ➤ Desktop Applications

- REScheck
- COMcheck

64,000+ registered users	Average 5,000 downloads per month
27,000+ registered users	Average 3,000 downloads per month



# User Registrations





# RES/COMcheck-Web Team

Rosemarie Bartlett

Linda Connell

Chris DeGraaf

Heather Dillon

Krishnan Gowri

Timothy Lawson

Wendy Maiden

Bob Schultz

John Wiberg



# Questions?