Overview to Internet/Intranet-Based ESB Technology

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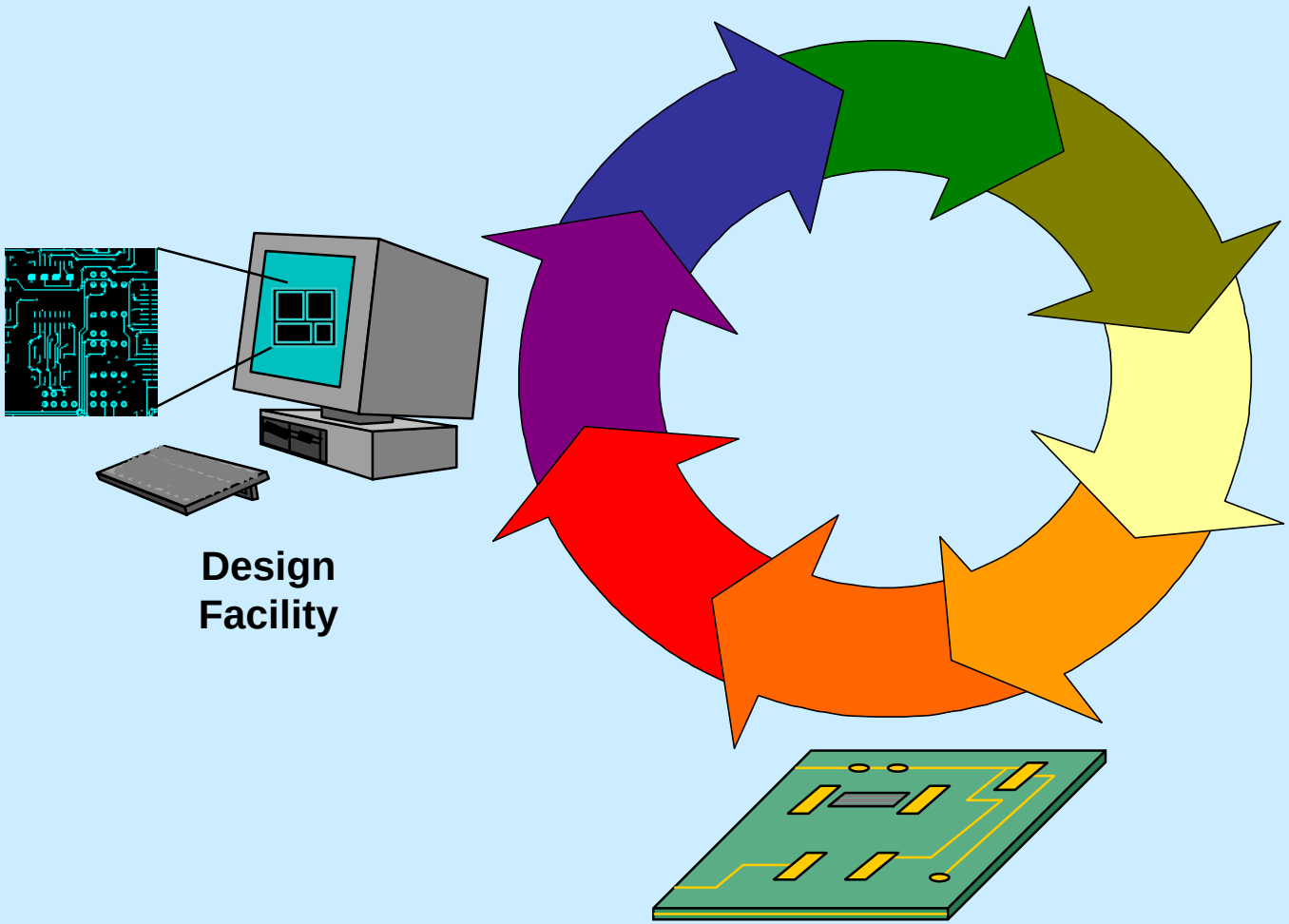
ProAM Project Meeting
June 17, 1999

http://eislab.gatech.edu/projects/proam/

Handout 3

Current Way of Doing Business: Costly

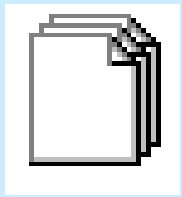


Design Facility

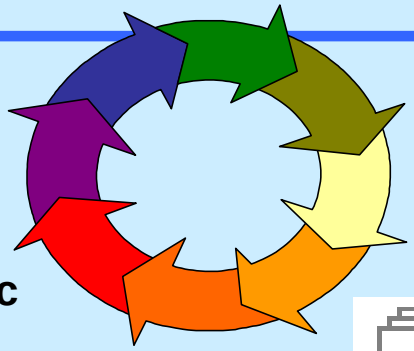
Manufacturing Facility

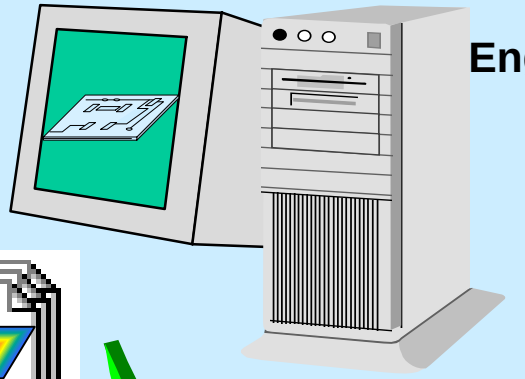
Printed Circuit Board

The Goal: Right First Time



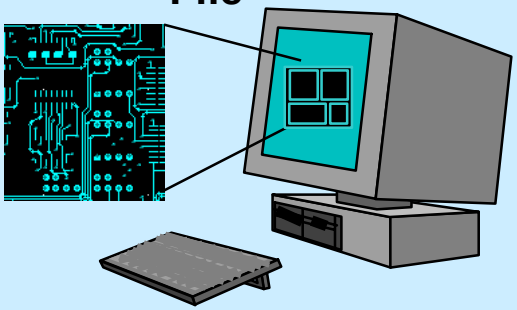
Electronic File



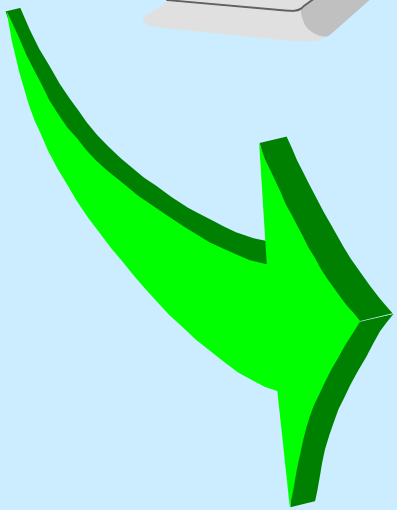


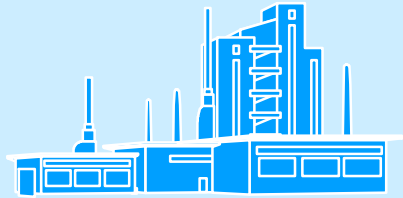
Engineering Service Bureau

Analysis Results

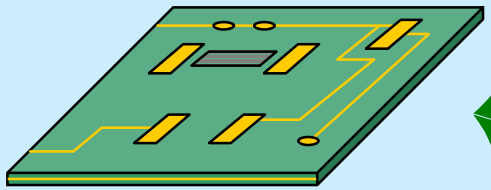


Design Facility

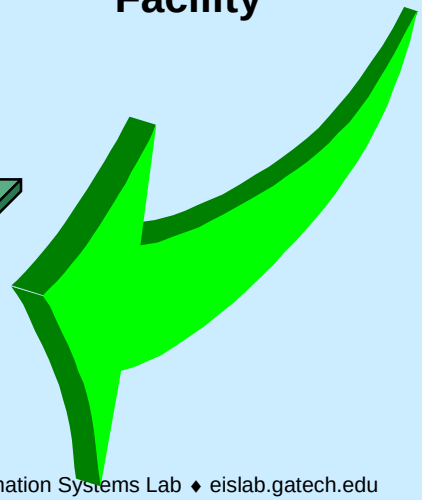




Manufacturing Facility



Printed Circuit Board



ESB Characteristics

- **Self-serve analysis**
  - Pre-developed analysis modules presented in product & process contexts
  - Available via the Internet
  - Optionally standards-driven (STEP, GenCAM ...):
    - » Reduce manual data transformation & re-entry
    - » Highly automated plug-and-play usage
  - Enabled by X-analysis integration technology
- **Full-serve analysis as needed**
- **Possible business models:**
  (beyond ProAM scope)
  - Pay-per-use and/or Pay-per-period
  - Costs averaged across customer base

Internet-based ESB Techniques

- Analysis module template & methodology
- Range of access methods:
  - Remote Tools
    - Login to remote workstation; X-Windows display
  - Thick Clients
    - Locally installed w/ Internet/LAN-based solvers via CORBA
  - Thin Clients
    - Web-based forms & solvers all located at ESB
- General web techniques

Technology Comparison

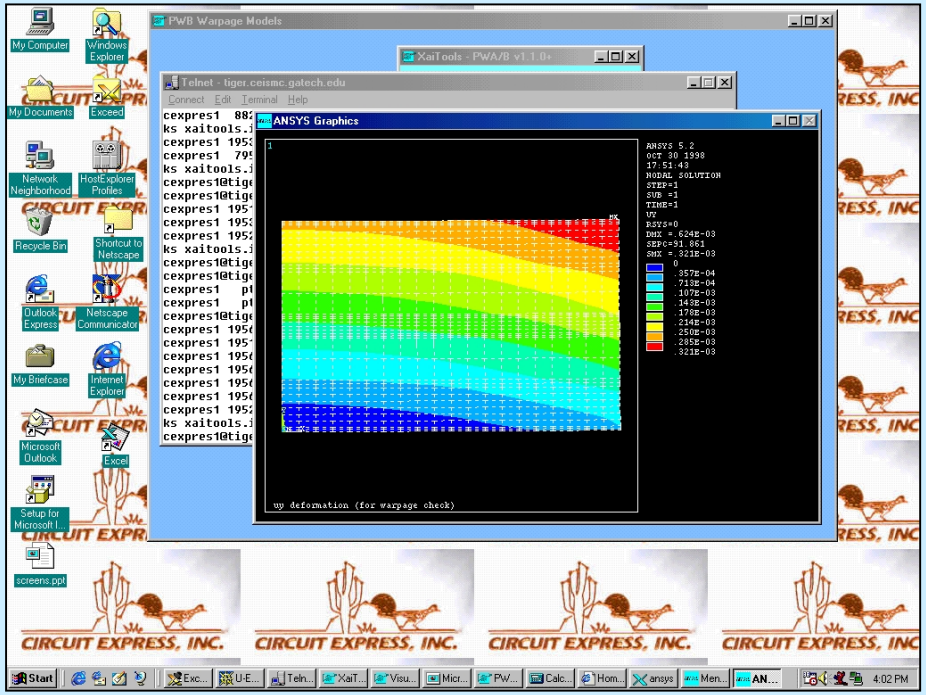
- Origins - TIGER
  - Web Augmented X Windows
  - Server based technology
- ProAM Extensions- Emphasis on client side processing
  - Web Form
  - XML Based Web Form
  - Java CORBA Client

"Thin Clients"

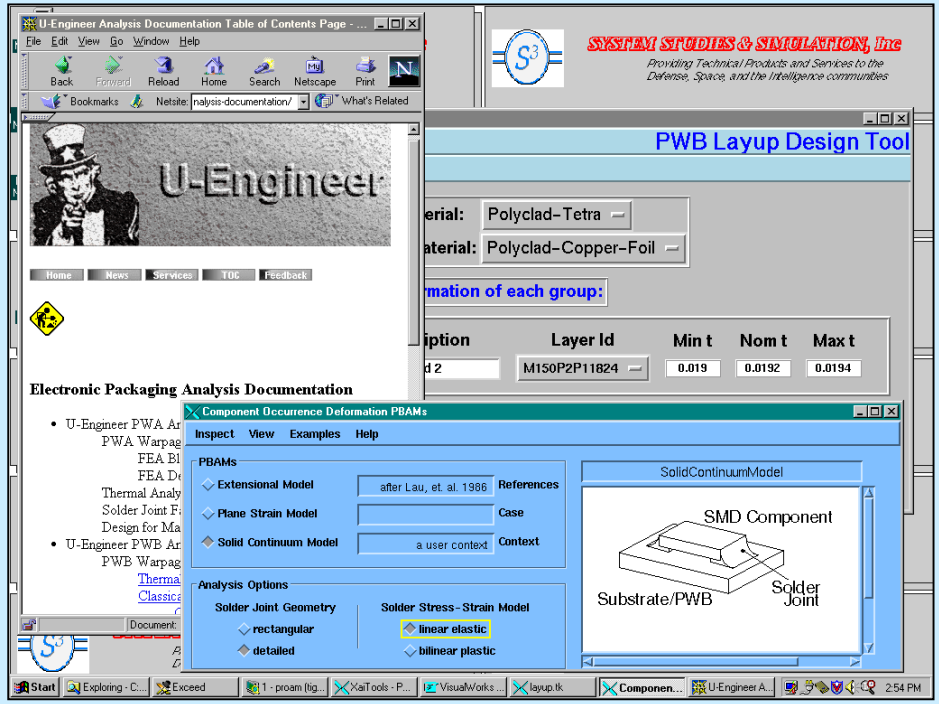
"Thick Client"

X-Windows / Server Based

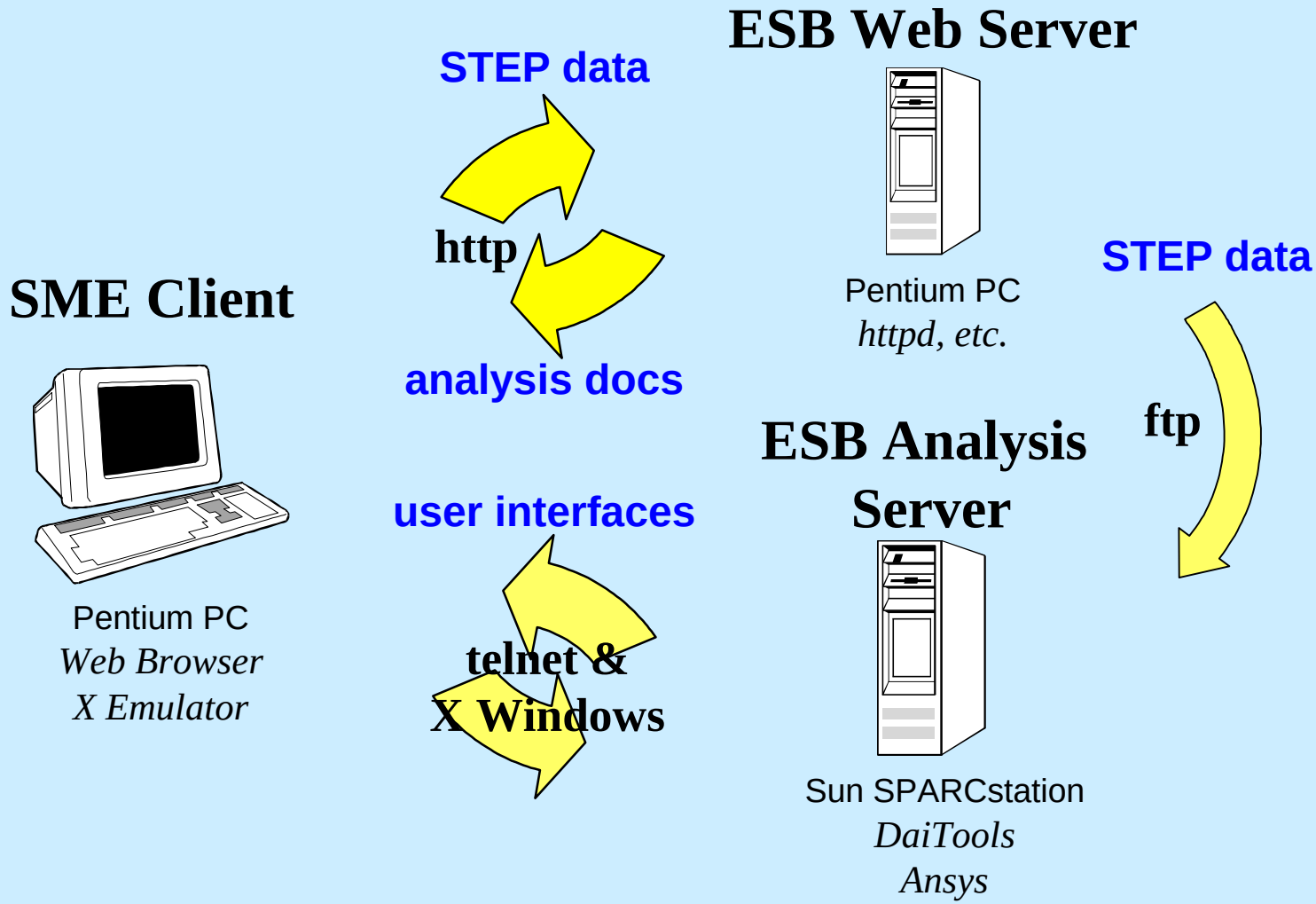
Circuit Express, Tempe AZ



S3, Huntsville AL



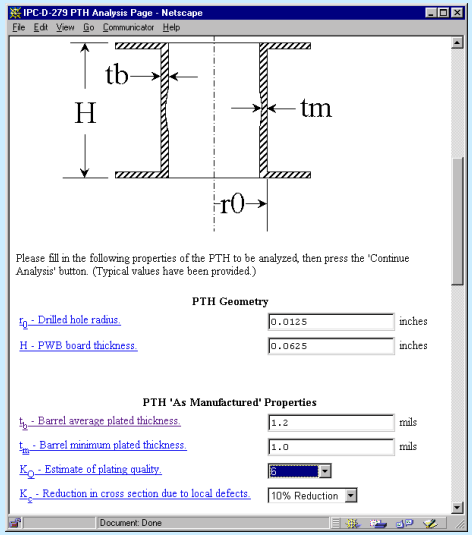
Analysis Data Flow
telnet & X Windows Approach



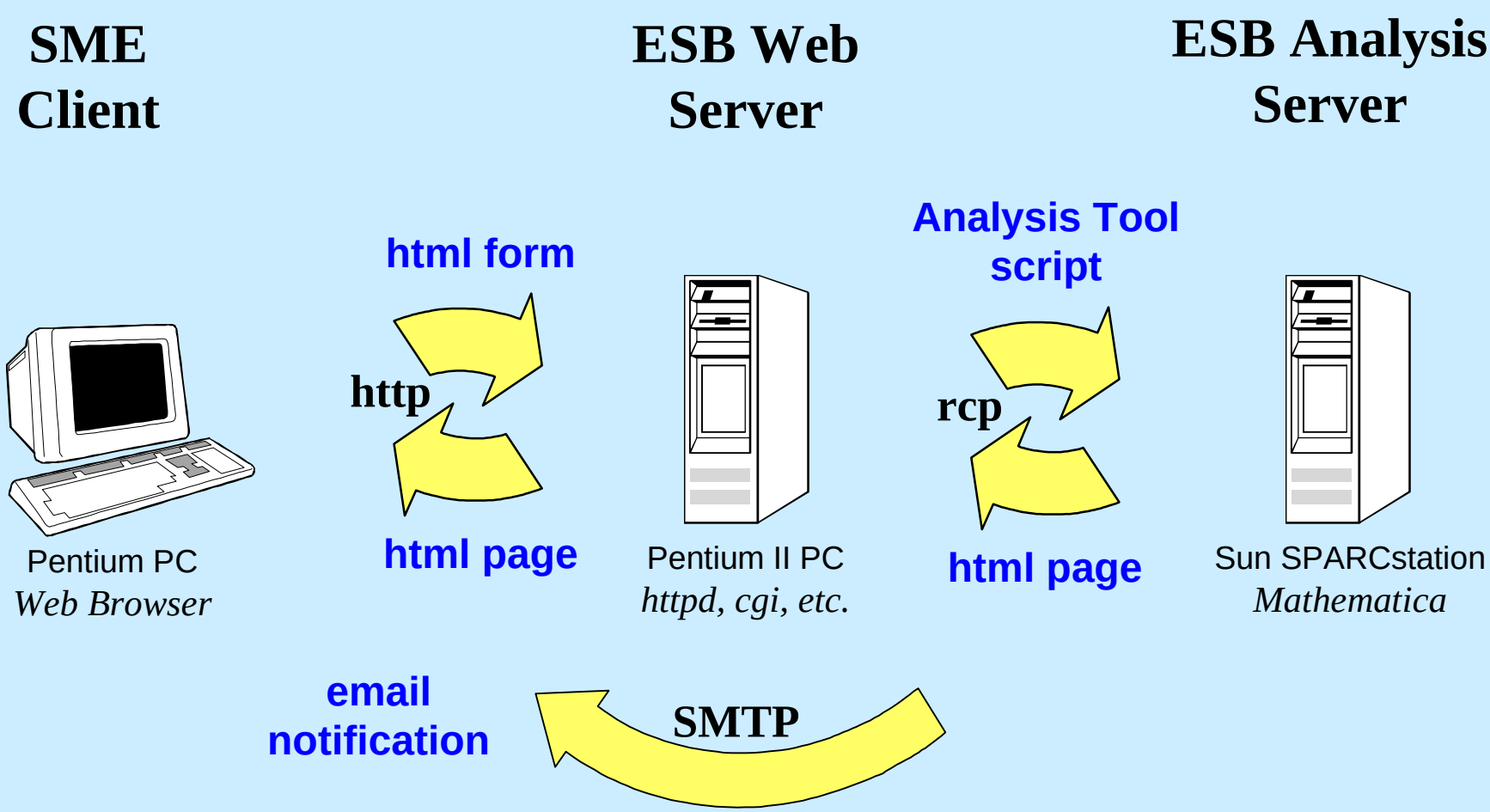
Technology Comparison

- Web Form
  - Code resides on server (cgi & backend)
  - No client side data processing or storage
    - » Therefore, very low computational power required
  - Secure via SSL, only idealizations of product provided

- XML Based Form
  - As above, plus
  - Browser processes design data
  - Higher computational demand, better for some tasks

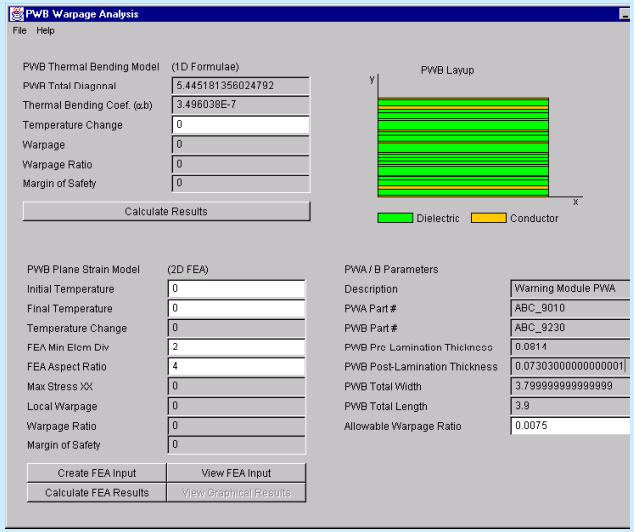


Analysis Data Flow
Web-based Approach

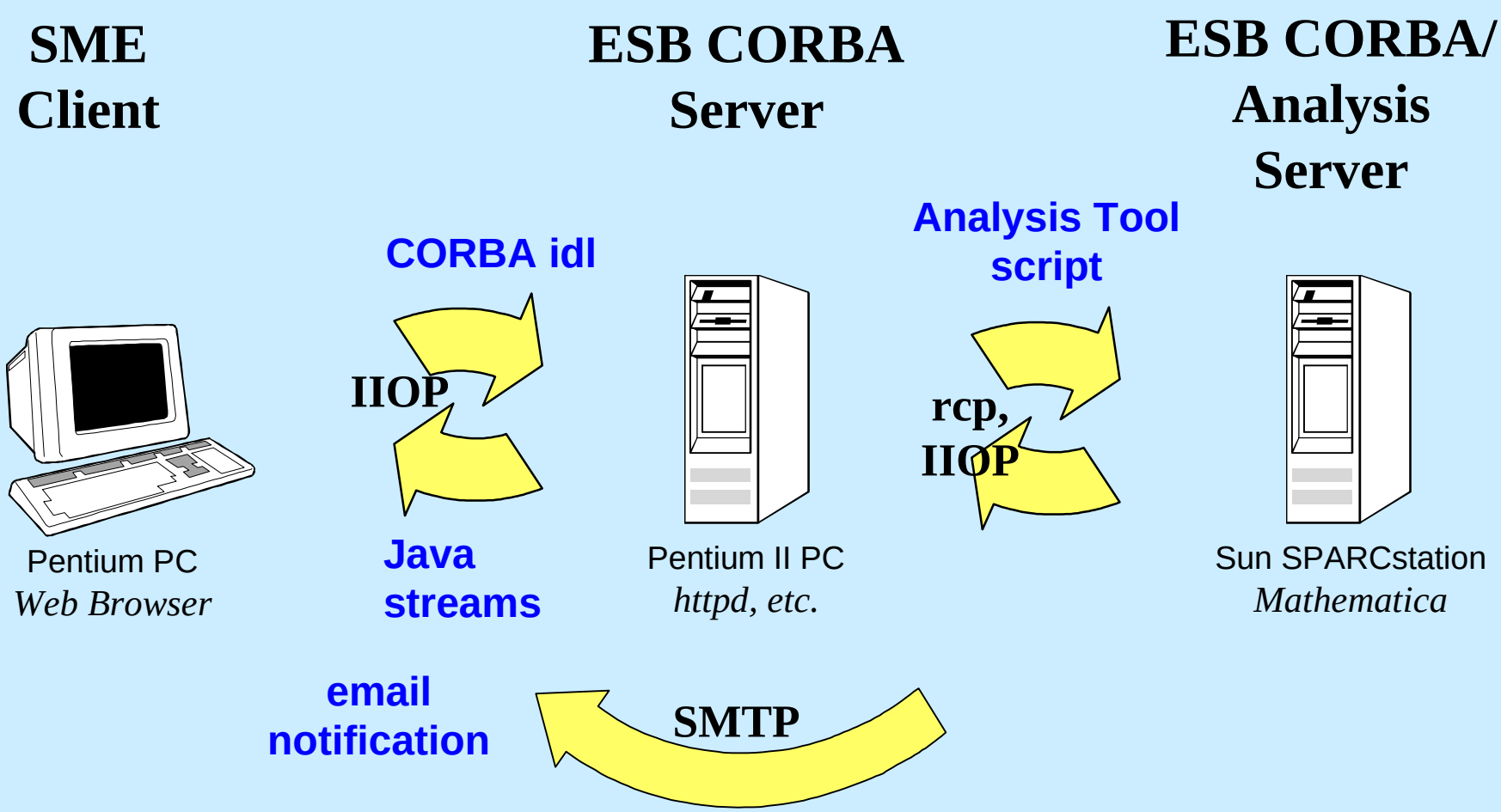


Technology Comparison

- Java CORBA Client
  - Local client runs code and stores data
    - » Much higher computational demand
    - » Greater power/flexibility
  - Backend code on server- CORBA and Analysis software
  - Only idealized attributes sent to host via IIOP



Analysis Data Flow
CORBA-based Approach



General Web Techniques

- Linux (Red Hat 5.2) is a robust platform
- CGI coding in Perl
- Limited use of Dynamic HTML/JavaScript on web pages to add functionality to HTML forms

Server Side: *XaiTools* Tool Architecture

MCAD: *CATIA*
IDEAS, Pro/E*, AutoCAD**
ECAD: *Mentor Graphics (AP210)**
*Accel (PDIF, GenCAM)**

Design Tools

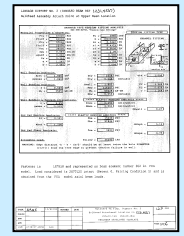
CAD Tool

Material Property Manager

Standard Parts Manager

Template Libraries: *Analysis Packages*, CBAMs, ABBs, APMs, Conditions**
Instances: *Usage/adaptation of templates*

Analysis Mgt. Tools
Pullable Views, Condition Mgr*, ...*



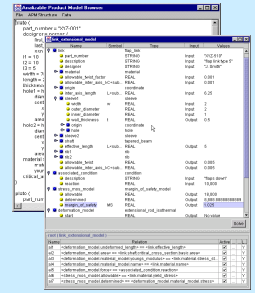
COB Schemas

objects, x.cos, x.exp

Persistent Object Repository
Java blob, ODBMS*, PDM**

COB Server

COB Analysis Tools
Navigator: *XaiTools*
Editor (text & graphical*)



COB Instances

objects, x.coi, x.step

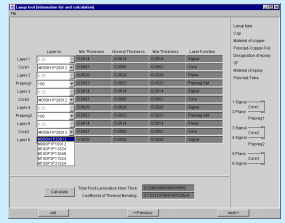
Other CORBA Wrappers*

Tool Forms (parameterized tool models/full* SMMs)

Analysis Codes

Constraint Solver

Custom Tools



FEA: *Ansys, Elfini*, Abaqus**
Math: *Mathematica, MatLab*, MathCAD**

Mathematica

asterisk (*) = in-progress/possible extensions