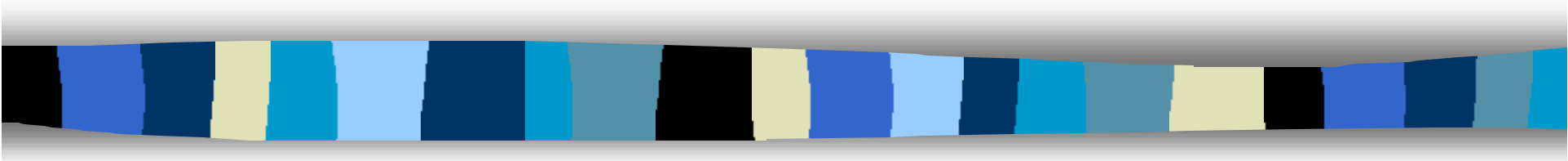


Third Annual PSM Conference, Vail, CO

Experience Implementing an Issue-Driven Measurement Approach



Wednesday, 21 July 1999

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The Beginning

- Feb. 1998 - Held PSM Workshop for large, maintenance program
 - *Top issues: Schedule bottleneck (2 - 3 weeks) due to SCM build delays and developer environment problems*
 - *Workshop instructors drafted initial Measurement Plan*
- Real world hit after workshop and managers had no spare time to implement new measure
 - *In March 1998 SEPG stepped in to pilot new measure*



The Pilot

- Researched existing mechanisms
 - *Interviewed SCM for details on system types, process steps, build frequency, and typical problems*
- Prototyped collection and reporting mechanism
 - *Designed SCM Build and Environment Problem forms, collection spreadsheet, and charts, and updated program measurement plan*



The Pilot, cont.

- Piloted new mechanism and reviewed results with SCM and IPT Leader
 - *Updated forms and charts*
- Program-wide meeting to discuss findings and experience paradigm shift



The Turnover

■ April 1998 Turnover

- *SEPG trained SCM to carry on data scrub/review*
- *SEPG transferred spreadsheet template and procedures to program metrician*
- *IPTL and SCM manager reviewed weekly reports*
- *SEPG reviewed logs and reports periodically*



Continuous Process Improvement

■ Findings

- New SCM tool involved new SCM procedures, developer training, shift in responsibilities, regular cross-functional interfaces, learning errors by SCM and engineers
- Development environment failures, incompatibility with new tool, and permission errors contributed to delays

■ Solutions

- March 1998 - additional training for developers
- July 1998 - 10-step sign-off sheet implemented; added pre-build for developers
- Oct. 1998 - Finished tailoring SCM tool to fit developer environment
- Nov. 1998 to present - Continue to tweak SCM tool to improve SCM productivity



The End

■ Results

- *SCM equipped to analyze problems*
- *Engineers fully skilled in new responsibilities*
- *Major, recurring environment problems fixed and preventions in place*

■ December 1998 - Goal achieved

- *Build efficiency increased 86%*
 - 10-step process reduced to a 3-day process (developers 1 day and SCM 2 days)
- *Reporting ended after 2 months with no errors*



PSM Measures

■ SCM Build Problems

- *Build Efficiency*
 - Main indicator of problem and is used to track progress towards shorter process duration
- *Error Rates*
 - Indicator of process quality
- *Build Complexity*
 - Used to find relationship with efficiency and error rate for predictability and process improvement purposes
- *Error Types*
 - Data labels used to see patterns for root cause analysis



PSM Measures, cont.

■ Development Environment Problems

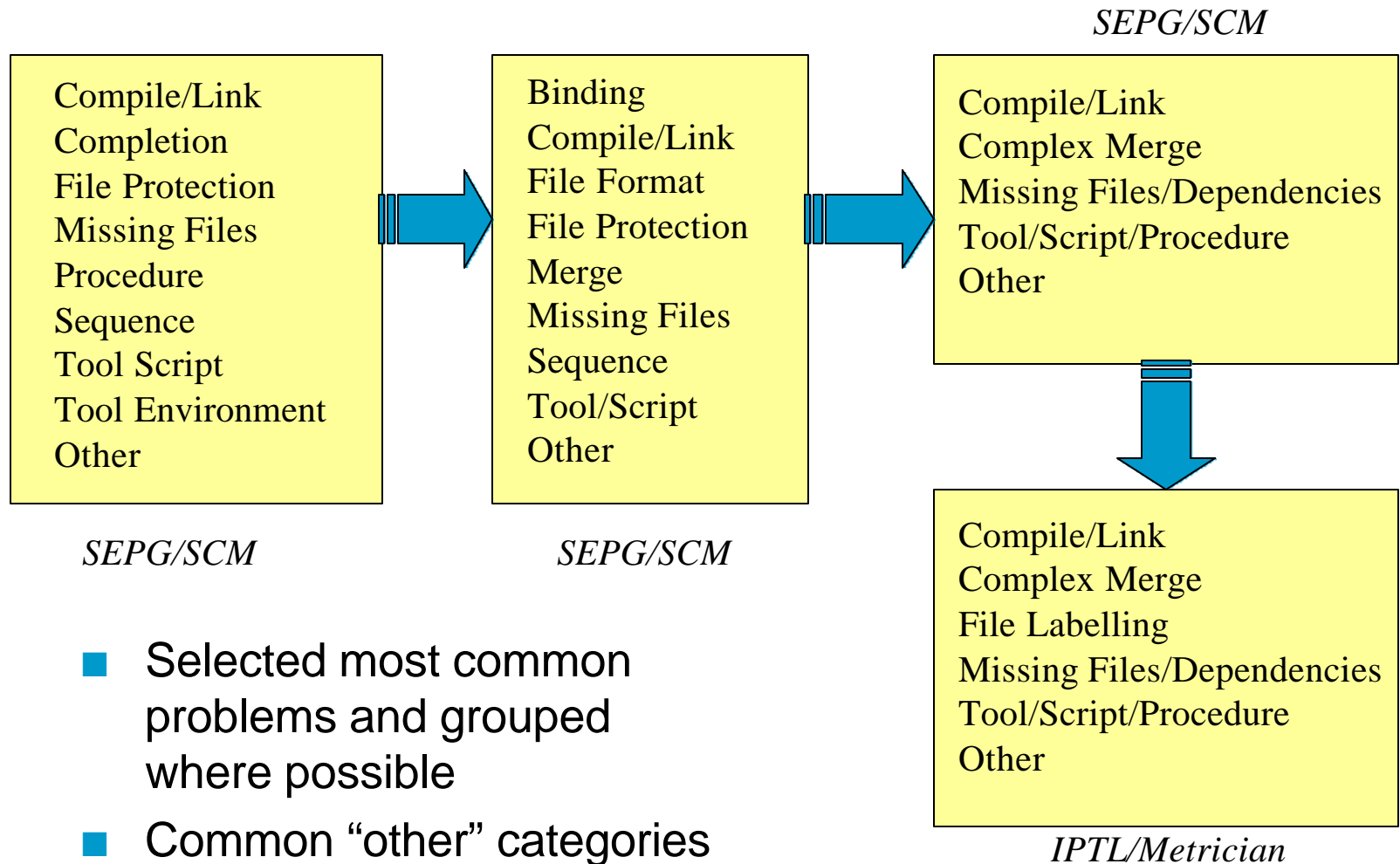
– *Error Rate*

- Indicator of environment quality: total environmental errors for each build

– *Problem Types*

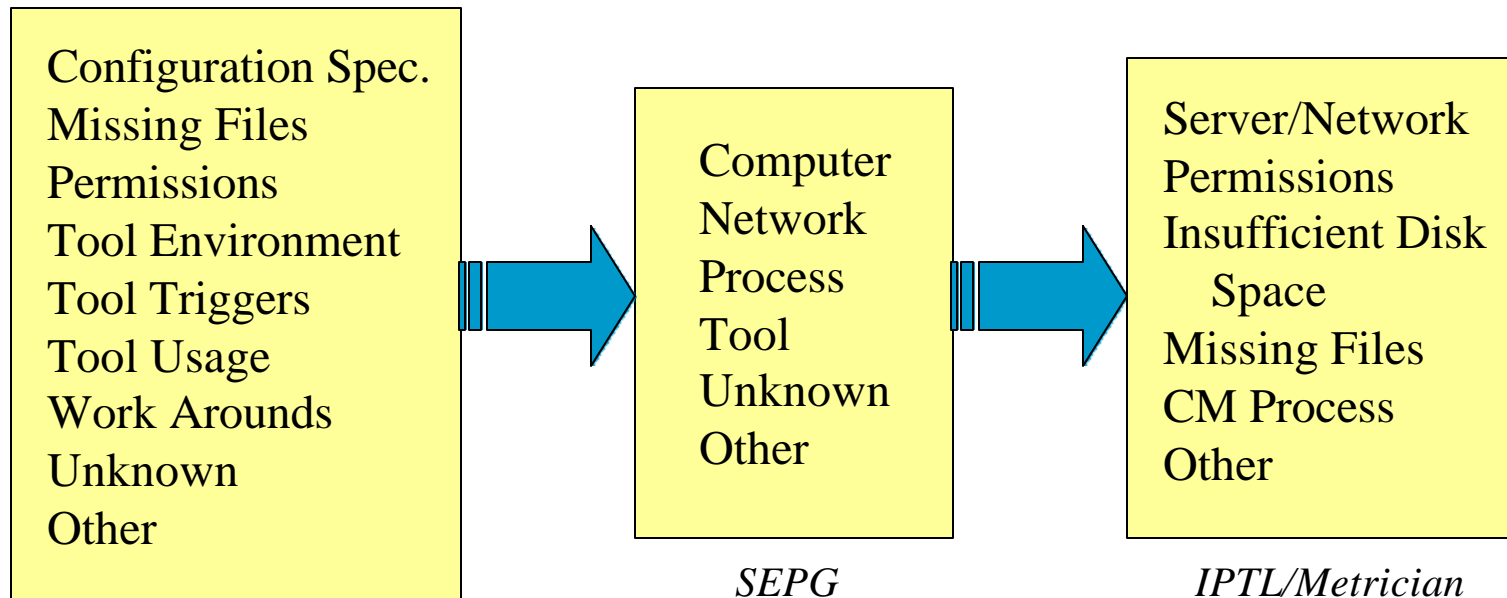
- Data labels used to see patterns for root cause analysis

Build Problem Categories



Environment Problem Categories

- Users easily confuse these problems for build problems and used wrong forms



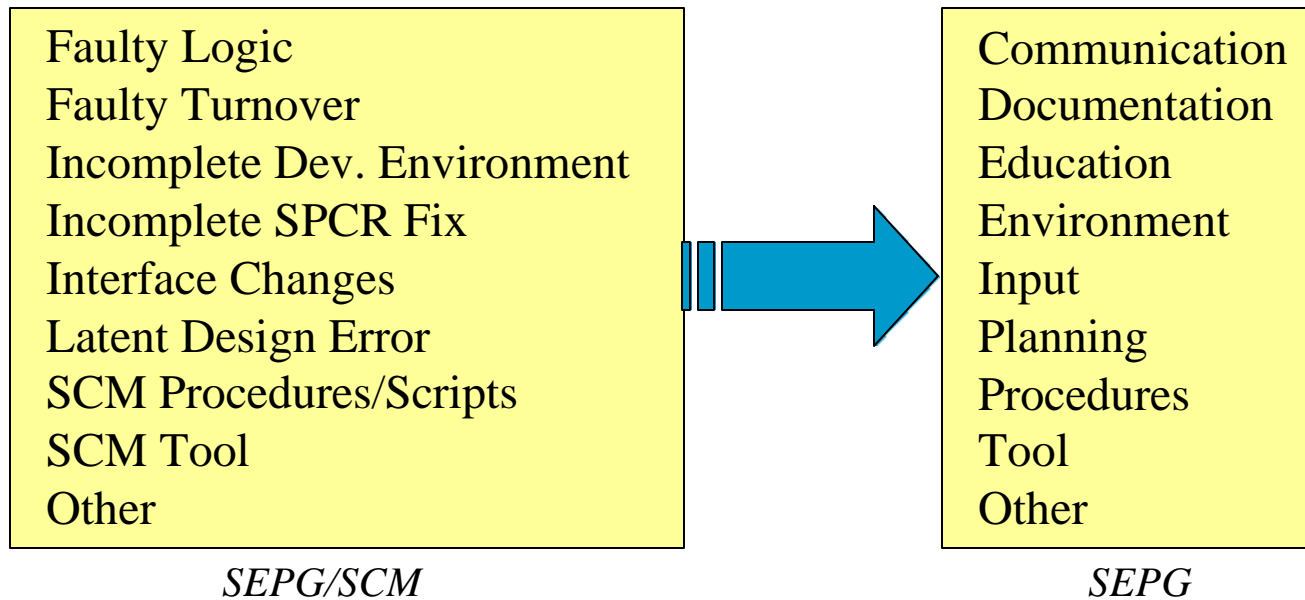
SEPG/SCM

SEPG

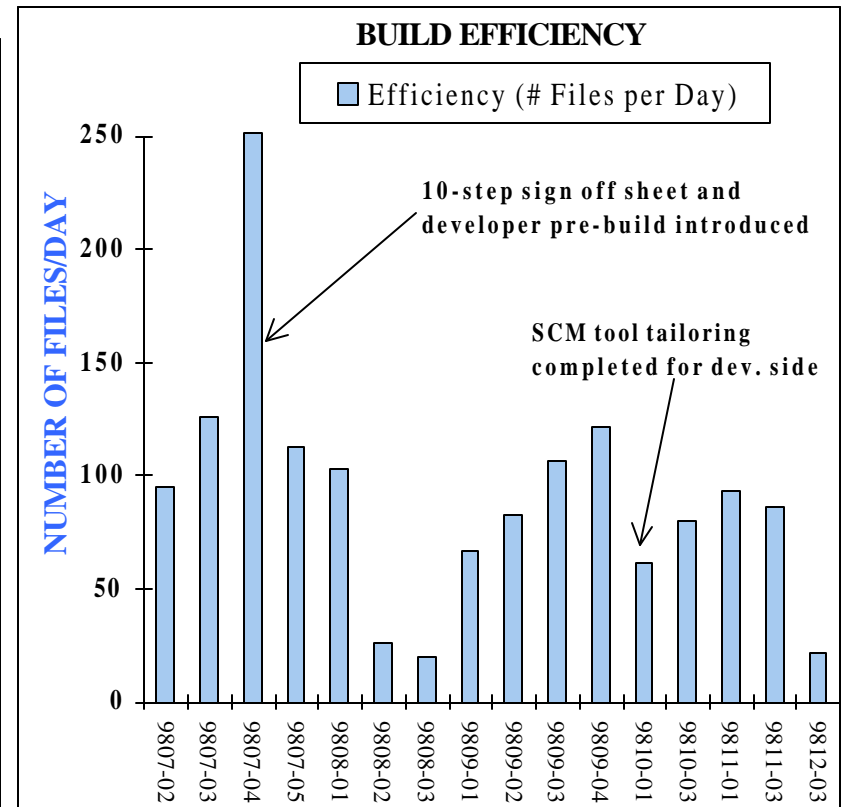
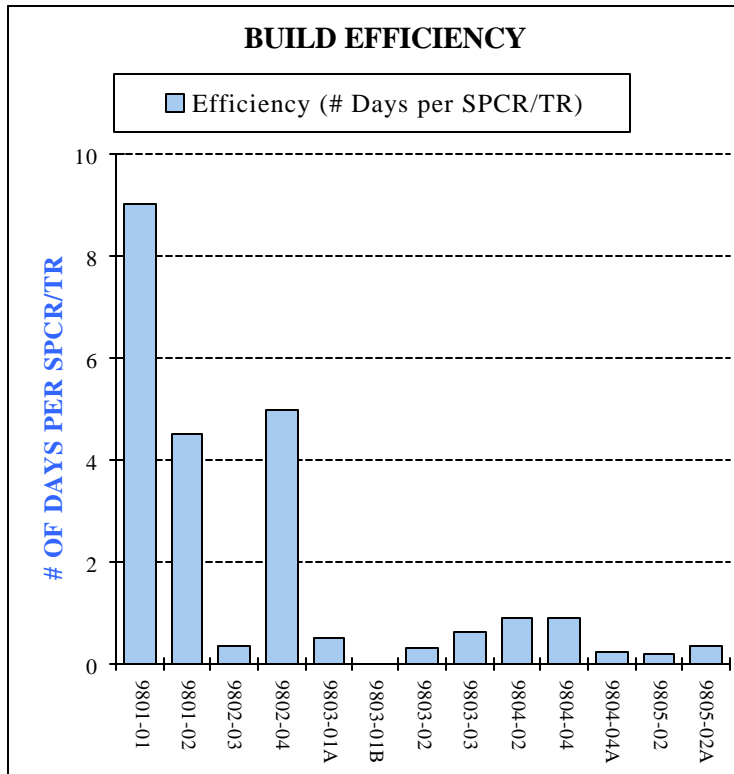
IPTL/Metrician

Build Problem Causal Categories

- IEEE and other references were good sources for stable set of categories
- Not charted; later dropped for lack of interest

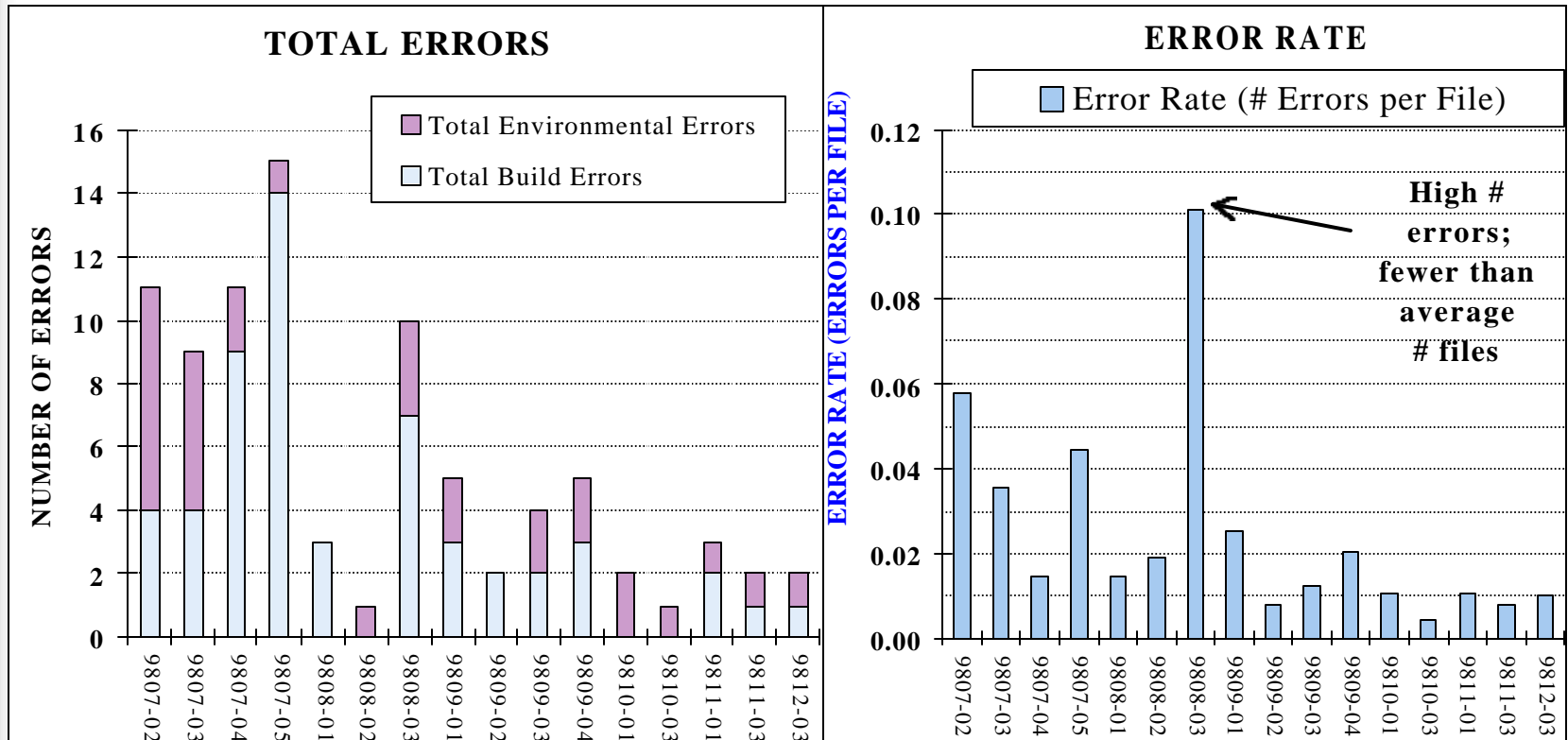


Efficiency Charts



- Viewed many different ways
 - Number of days per SPCR/TR
 - Number of days per file
 - Number of files per day (BETTER)

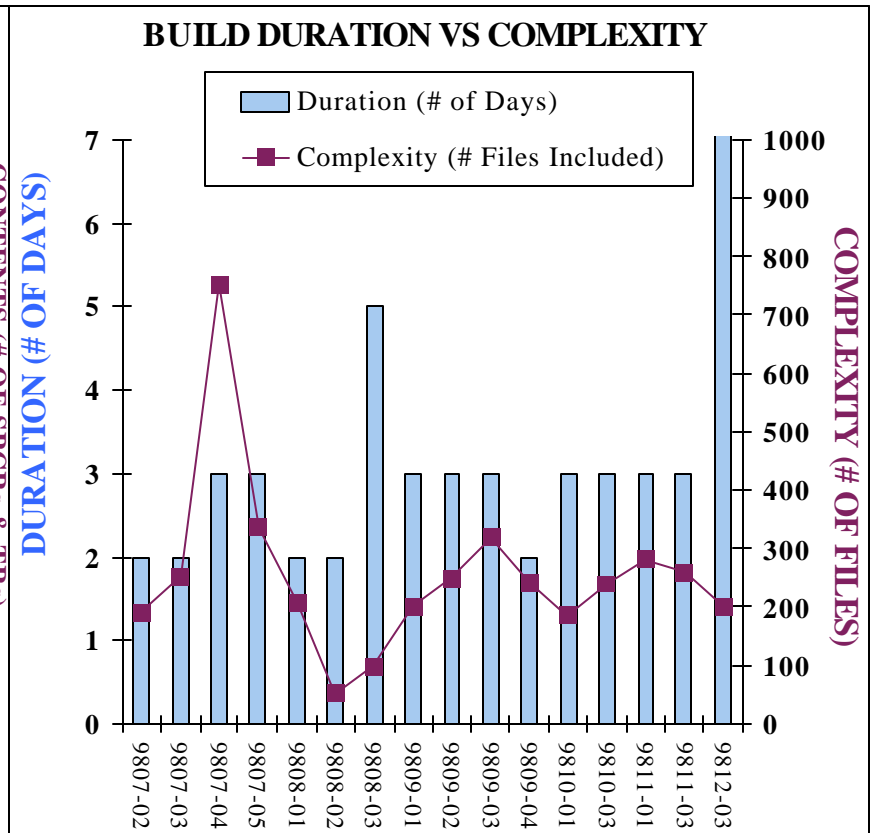
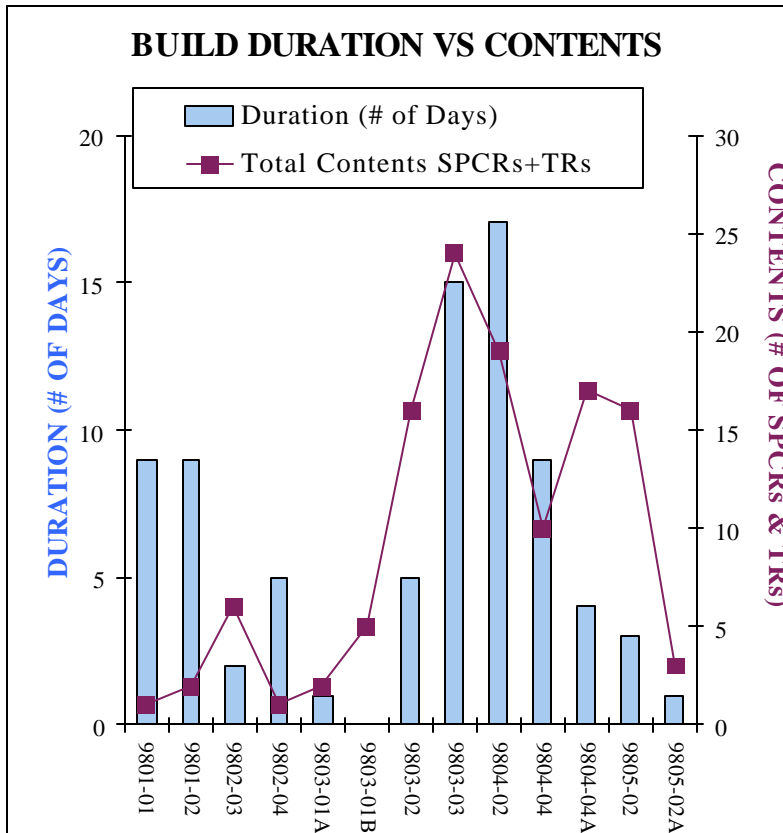
Error Rate Charts



- Flags problems for engineering and resource management groups
- Loses magnitude of error impacts

- Links build process errors to build

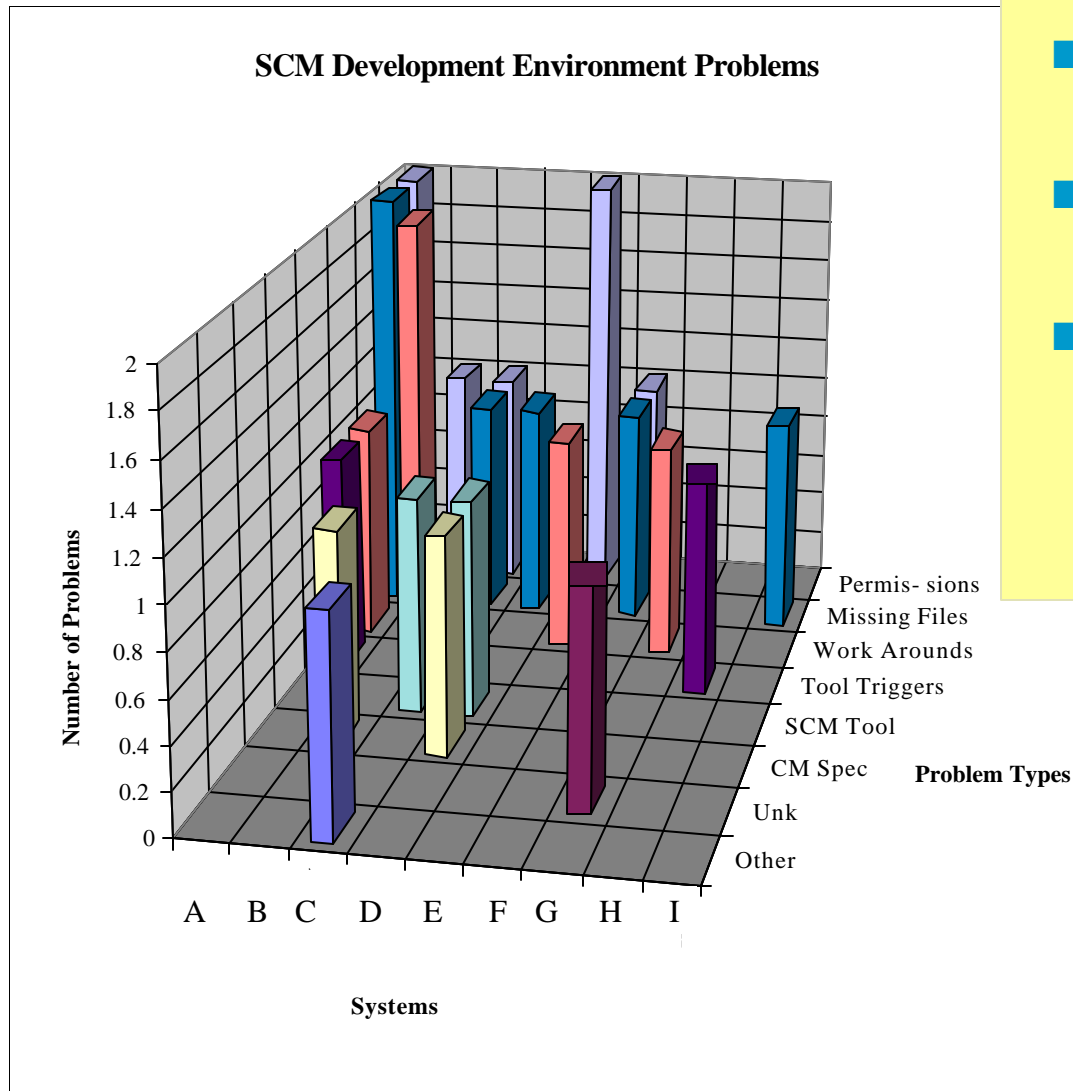
Complexity Charts



■ Duration is main indicator of process improvement progress

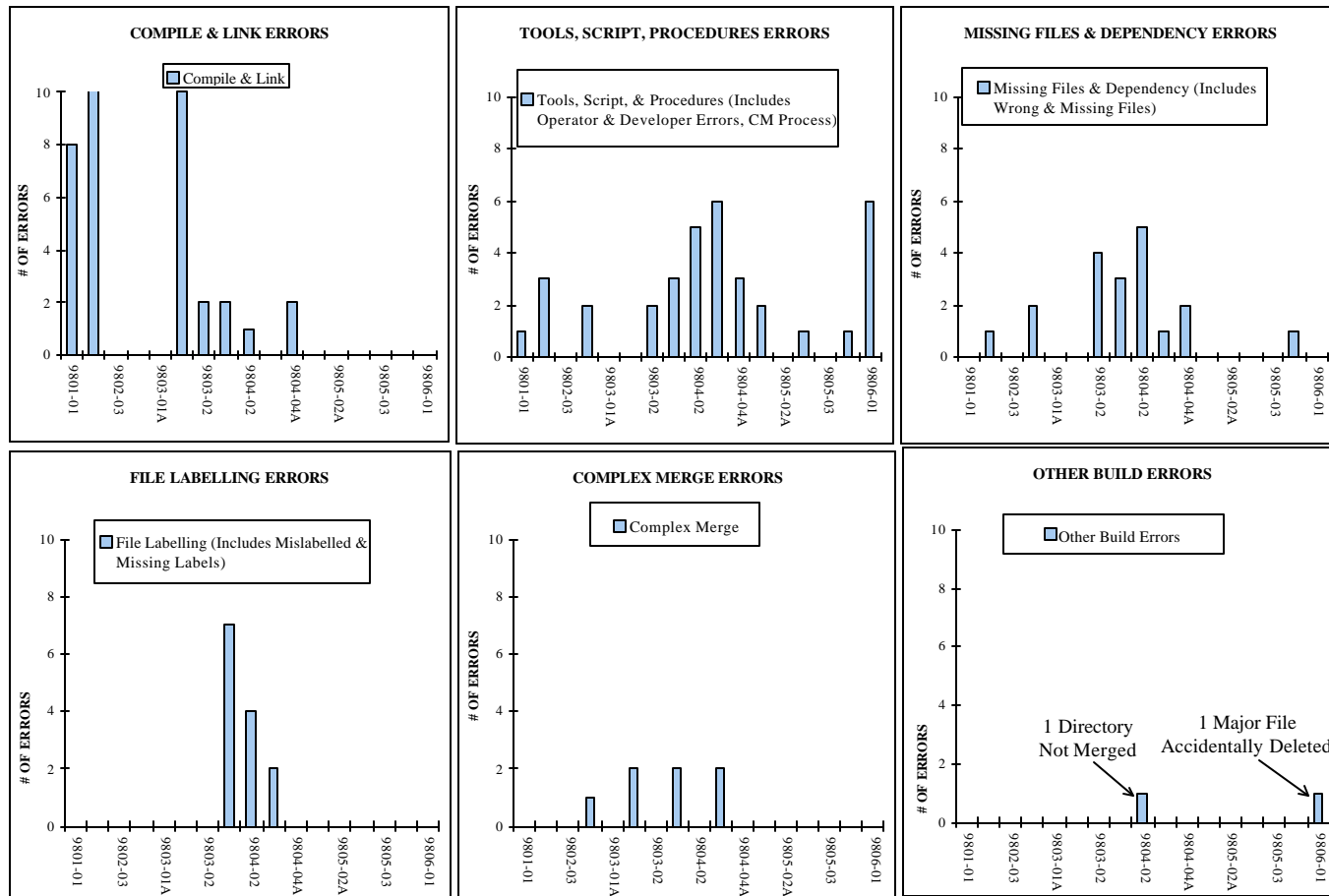
■ Number of files is better view of complexity for builds--better granularity than SPCRs/TRs

Type Charts



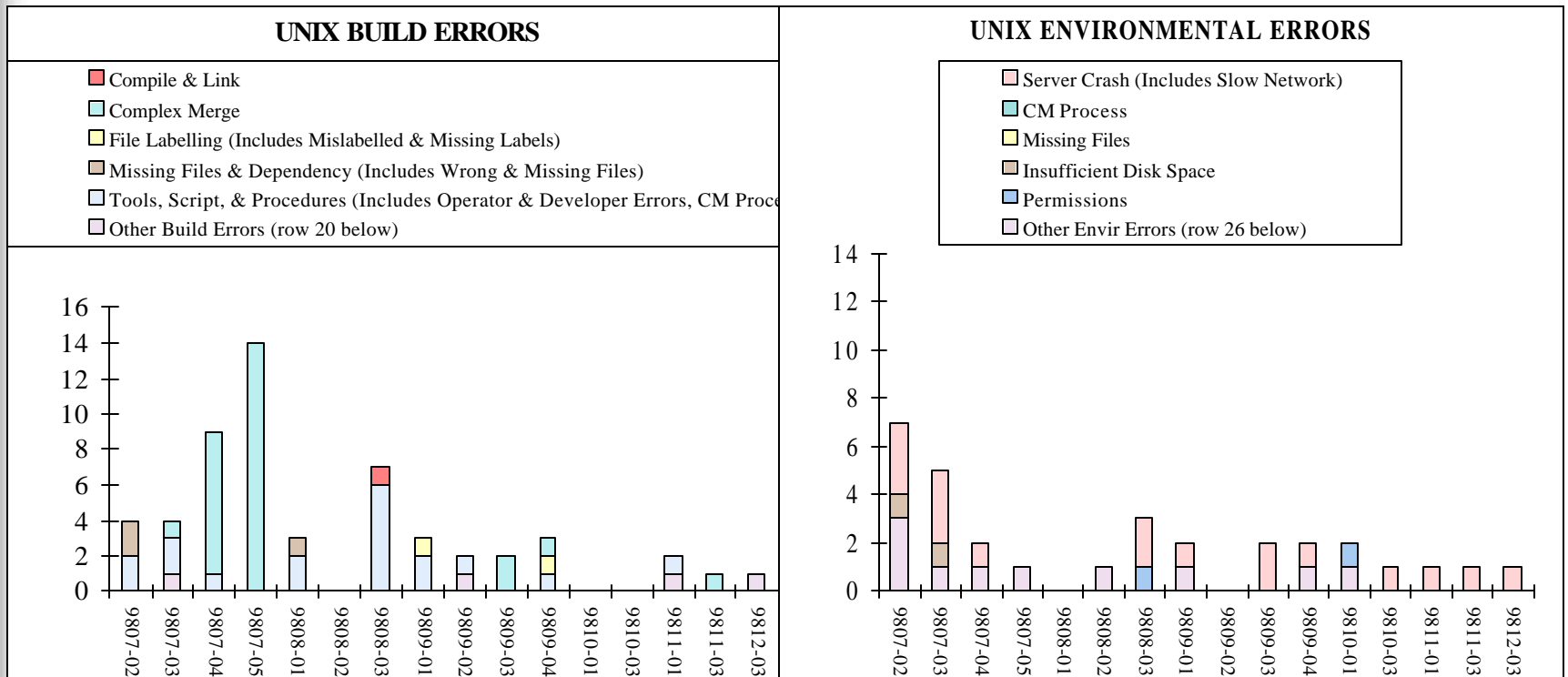
- 3D is too complex for users
- Does not show trends
- Decided to focus on most prominent system and use 2D charts

Type Charts, cont.



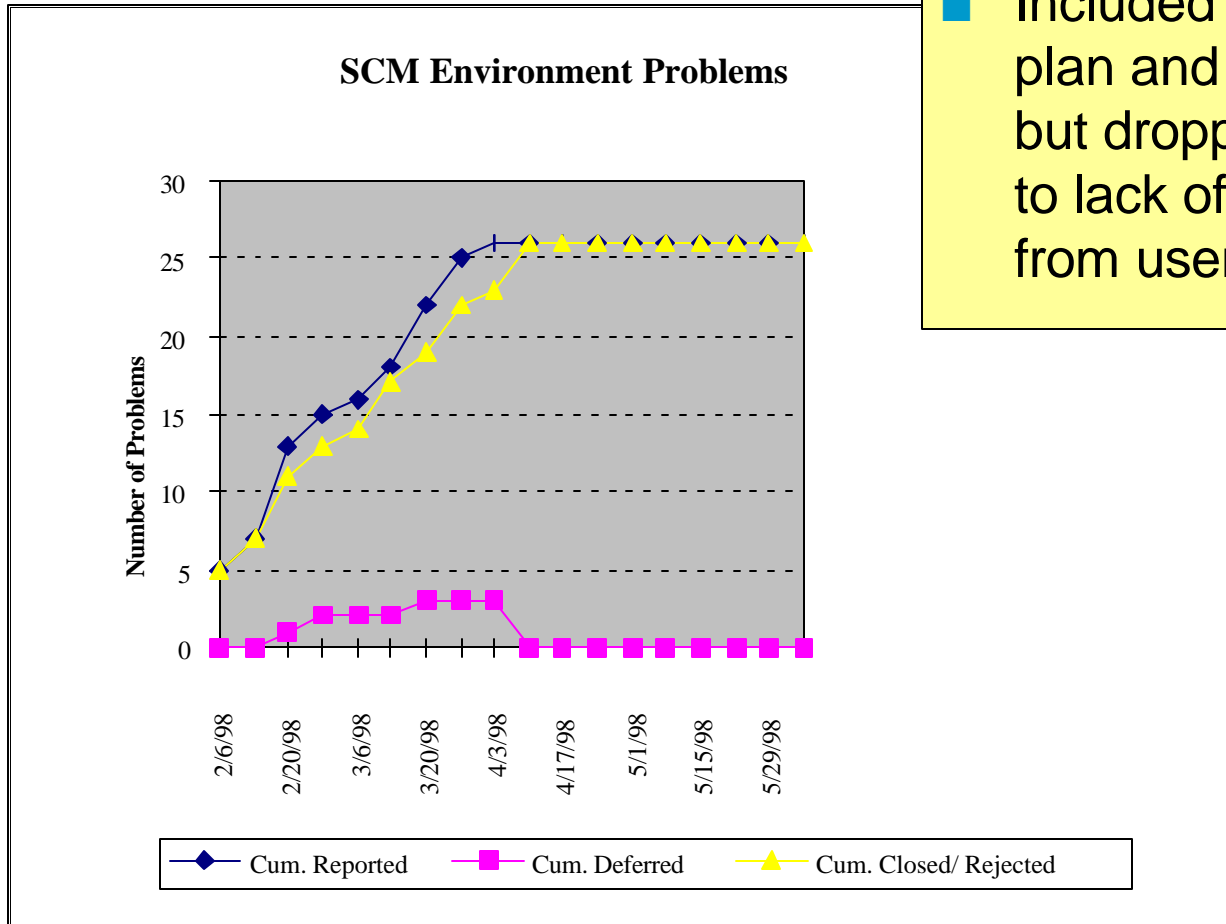
- Individual trends easily seen
- Difficult to see more than 6 months of data

Type Charts, cont.



- Stacked histograms reduced 12 charts to 2
 - Shows variety of problem types but more difficult to see individual trends

Problem Status Charts



■ Included in initial plan and report but dropped due to lack of interest from users



Lessons

- New measures can take 2 labor months to implement
 - *PSM workshop identified top 10 measures but 2 or 3 are realistic before repeating exercise*
- Management commitment and interest is vital to implement new measures
- Keep list of problem or causal categories short and meaningful to users
- Data must be checked before each report
 - *Consistency and completeness*
 - *May involve other disciplines*



Conclusions/Next Steps

- Program is ready to apply SPC charts to this process
 - *Threshold is so low that histograms no longer indicate show events requiring further investigation*
 - *Historical view will be helpful to link process improvements to quantitative results*
 - *Major understanding and improvements have been achieved; now focus on small, continuous, improvements and document on charts*