Some of My Metrics

- Over 2 million frequent flyer miles
- Consulted on every continent except Antarctica
- Presented papers at conferences in USA, Europe, Middle East, Asia, and Australia
- Written and published articles in American Programmer, Software Development Magazine and Journal of Information Systems Management
Clients

- Clients include Banking & Finance, Aerospace, Retailers, Animal Food, Telephony, Consulting Companies, Medical Research, Defense Contractors, Automotive, Universities, Government Agencies and others.

Why Measure?

- The primary purpose of a measurement program should be to helping project managers make project decisions.
- You can’t manage what you can’t measure!
- If you are not measuring, then how are you managing?
Benefits of Function Point Analysis

- Improves requirements documentation
- Improves the estimating process
- Improves the communication of workload
- Improves the understanding of business functions
- Improves traceability of requirements through implementation
- Improves the allocation of resources
Recommend Questions?

- When you provide an estimate expect the question - How did you come up with that number?
- What percent of your time do you expect to spend in design, requirements, testing, coding?
  - How does this compare to past projects?
- What variables between like projects cause variations between projects?
- What have you done to improve productivity? Or reduce costs?
- What attributes of a project are inherent – nothing you can do about it.
Worst Practices

- No historical data
- Failure to monitor and report status
- Creating requirement and analysis documentation after project is completed.
- Excessive and irrational schedule pressures
- Failure to establish clear acceptance criteria
- Reduce testing time to make schedule
What is a Function Point?

- Function Points are a unit of measure
  - Like a hour is to measuring time
  - Or a inch is to measuring distance

- A unit is important to understanding and communicating such metrics as *Average Cost*.
Function Point

- A software application is in essence a defined set of elementary business processes.
- A function point is not a screen, a report, an online, but instead an elementary business process. We often count screens, reports, and online's so on and so forth, but these are not function points.
The point of FPA

- All other industries are managed by unit cost except the software industry.
- FPA when combined with hours or $ is nothing more than the unit cost of software development or $/FP.
Function Points Analysis

- Is a structured technique of classifying components of a system.
- Is a method to break systems into smaller components, so they can be better understood and analyzed.
- Measures software by quantifying its functionality provided to the user based primarily on the logical design.
- Logical functionality from a sophisticated user view rather than a physical view.
- A standard method for measuring software development from the customers point of view.
Estimate the Surface Area of a Can of Diet Coke
World Class Organizations

- Little concern being the best maintenance organization
  - Concerned with delivering new and improved products.

- Focused on doing a few things very well
World Class IT Organizations
Commonalities

- Consistent Documentation
  - Requirements
  - Analysis
  - Adopted Use Case (or similar) Methodology

- Consistent Processes
  - Staff creates software in the same manner

- Technical staff very focused on the business not on IT
  - Difficult to see the barrier between IT and Business
World Class IT Organizations

- It is impossible to separate world-class organizations from world-class metrics organizations.
Measurement/Goals

- Measurements need to support the goals of the organization
- Measurement should not drive goals
- Management should drive goals
Current Metrics Process

- Focused on Senior Managers
- Limited usage by application managers
- Seen as overhead by staff
  - Seen as adding no value
- Focused on Application FP Counts
- Too much time spent on creating graphs instead of analysis of data
Current Metrics Process Continued

- Application managers have no idea of unit costs
  - By application, By business function, By type (online, reports, files, so on and so forth)
- Application managers do not analyze past project plans
- Estimating is not done consistently throughout the organization
- Application managers are not tracking productivity of their applications
- Data tells me the development process is inconsistent
- Design is done before requirements
Characteristics of Effective Measurement Programs

- Aligned with business objectives
- Integrated with continuous process
- Tied to decision making at lowest level possible
- Balanced metrics at all levels
- Focused on measuring processes
- Viewed as mission critical
Who is faster?
## Hours Per Function Point

<table>
<thead>
<tr>
<th></th>
<th>World Class</th>
<th>Best In Class</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours/ FP</td>
<td>19</td>
<td>25</td>
<td>35</td>
</tr>
</tbody>
</table>

But it depends!
Worst Practices Metrics Programs

- Making a metrics group responsible for the data
- Centralized function point counting
- Data created from inconsistent requirements and analysis documentation
- Completing FP Counts without a clear purpose
- Metrics are seen as separate process and/or overhead
Best Practices Metrics Programs

- Making application teams responsible for the data
- Decentralized function point counting
- Data created from consistent documentation
- Organize FP Counts to be aligned with the business functional decompositions.
- Metrics seen as added value and used by application managers.
- Metrics team assist and advise application managers on the how to.
Recommendation

- Use the data that has been collected to date
- Create historical baselines
  - Examine several past projects and determine historical hours per function point ratio
    - Application by Application
      - May have multiple ratios for an individual application
        - By business functions
        - By online, reports, interfaces, so on and so forth
  - What is causing variances
What to Re-engineer?

Maintenance Hours per Function Point

To small to benefit from re-engineering

Candidates for Re-engineering

SIZE (in Function Points)
What is causing variations

- Age of application
- Language or is it mixed (several languages)
- Size of project
- Size of project relative to size of application
- Methodology Used
- Blend of project (online's, interfaces, batch)
- Number of applications involved in project
- Rationality of Schedule
- Tenure of staff
Random Productivity Rates?
What is your trend?
Recommendation

- Create just in time function point training
- Training needs to be application specific
- Training needs to be short, concise and to the point
- OJT Function Point training if possible
- Clear up any outstanding FP Counting Issues
Recommendation

- Create internal function point counting guidelines
  - Developed from application specific training

- Develop Standardized estimating process
  - Estimating is important so resources can be allocated in the most efficient manner possible.
Accuracy of Estimating

Size of Projects

Actual Accuracy

Required Accuracy

Difficulty of Estimating

Not Difficult

Very Difficult
Characteristics of a good estimate

- **Explainable**
  - What method was used to derive the estimate?
  - Can changes in project effort be communicated in a concise manner?

- **Revisable**
  - As the project progresses will the estimate be revised using the initial process.
  - Is the estimating process continuous and repeatable?
Recommendations

- Track project growth from requirements to implementation.

- Charge a different cost per function point for changes made during requirements, design, analysis, coding, testing and implementation.
Recommendations

- Force the use of historical data for estimating purposes
  - It will improve the quality of future data

- Create a consistent estimating process using function points (historical hours per function point)
Recommendation

- Decentralize the function point and metrics mechanics
- Force project teams to take the initiative to develop their own dashboards.
Recommendation

- Continue to benchmark, but benchmark activities not just data!
- Visit best in class companies
Recommendation

- Comparing % of time spent in testing, design (or any phase) across projects
- Examine hours/fp ratios within the application
- Create control charts with upper and lower bounds (based upon past performance).
- Develop standardized terminology
- Use metrics to identify problem areas
Software Past, Present, Future

1980
- Requirements: 5%
- Design: 15%
- Testing: 20%
- Coding: 60%

Future
- Testing: 30%
- Requirements: 25%
- Design: 40%
- Coding: 5%

Present
- Requirements: 20%
- Design: 40%
- Testing: 25%
- Coding: 15%

Design = 65% of Project

Requirements +
Recommendation

- Create appropriate cost categories.
  - Maintenance
    - Corrective
    - Adaptive
    - Perfective
  - Enhancement
  - Development
Recommendation

- Create appropriate hours per function point categories (basis for budgeting).
  - Maintenance Hours Per Baseline Function Point
    - Corrective Hours Per Baseline Function Point
    - Adaptive Hours Per Baseline Function Point
    - Perfective Hours Per Baseline Function Point
  - Enhancement Hours Per Project Function Point
  - Development Hours Per Project Function Point
Create Standard Glossary

When querying (no calculations) data use the following verbs.

- **Get**: a search of a single database where the database resides entirely within the application boundary.
- **Find**: a search of multiple databases where the databases resides entirely within the application boundary.
- **Retrieve**: a search where the information resides entirely outside the application boundary.
Recommendation

- Organize applications so they match the business functional decomposition.
  - Function Point Counts need to be organized in such a manner.
- Explore training and having business partners participate in function point counting.
Recommendation

- Go to the requirements table with the right questions and be able to offer business alternatives.
  - Same business functionality implemented in the shortest time frame and shortest duration
- Offer innovative solutions to business problems.
  - Same business functionality, but in a different application
Static HTML Pages?

- How does this differ from user documentation?
- Who should be updating these pages?
- How much additional time does this take?
Re-Use

- Inter – application
  - Reusing business functionality between applications.

- Intra – application
  - Reusing business functionality within a single application.
What’s Next

- Execute the recommendations
- www.SoftwareMetrics.Com
Questions and Answers

- **Do we really need to improve?**
  - If you are pretty confident that your competition (other insurance carriers) is not trying to improve the answer would be no. But I am pretty sure your competition is trying to improve.

- **How often should a baseline be revised or re-counted?**
  - If you do a function point count for your projects, then you should know what is new functionality. This functionality should be added to your baseline FP counts.
Q&A Continued

- How often should I revise my function point count for a project?
  - Whenever there are enough changes to cause your estimate to increase. If your project increases by 20 percent during design, should you wait until design is done to raise a flag and communicate this to your management? No. As your project grows you should communicate the impact to your management.

- What you are really suggesting is behavioral changes, right?
  - Yes, but keep in mind what gets rewarded gets done. The behavior that gets rewarded gets done. The behavior that gets punished stops – or it should stop.
Q&A Continued

- Is there a cost to achieve higher levels of CMM or higher levels of productivity?
  - Of course, but there will be a payback also. There is a cost and benefit. It is much easier to move from CMM 1 to 2 than it is from 2 to 3. Organizational improvement becomes more difficult as it progresses. This is true for dieting also. As we lose weight it becomes progressively more difficult to lose more weight.

- Is there any plan to communicate this to our business partners?
  - That is a good suggestion and I would recommend that, but I am not sure if there is any plan to do this or not.
Q&A Continued

● How do we educate our customer?
  - Most people react well to facts and figures. I saw a video of your CEO and it is clear that the culture is to manage by the numbers and to be fact based. I do not imagine metrics and function points is going to be a hard sell to your customers.
  - Keep in mind that IT needs to adapt to the business not the other way around!

● Are we going to be asked to answer questions for which we have no data?
  - Ha, that is a great question. I would recommend that you find the answer if you do not know. I don’t know, but I will find out is a suitable answer.
Q&A Continued

- What are reasonable expectations to achieve 19 hours per function point, when, how long, cost?
  - Your management has given you a target (a pretty clear target). They are not telling you how to get there, I expect they will look to you to define how, when, cost.

- What other metrics (besides function points) do I need to gather and use for my dash board?
  - At a minimum you should know the percent of time you spend by phase (and by task) and how this relates to past and current projects.
Q&A Continued

- You said that World Class companies do not work overtime, are you communicating this to our management?
  - OK…I am not suggesting that if you do not work overtime you will become world class. What I am

- How distributed do I need to have my function point counts?
  - It really depends on your application. Some applications unit cost (hours/fp) will not be as varied as other applications. The correct answer is you want to have your unit costs defined at enough granularity to help you understand variations.