

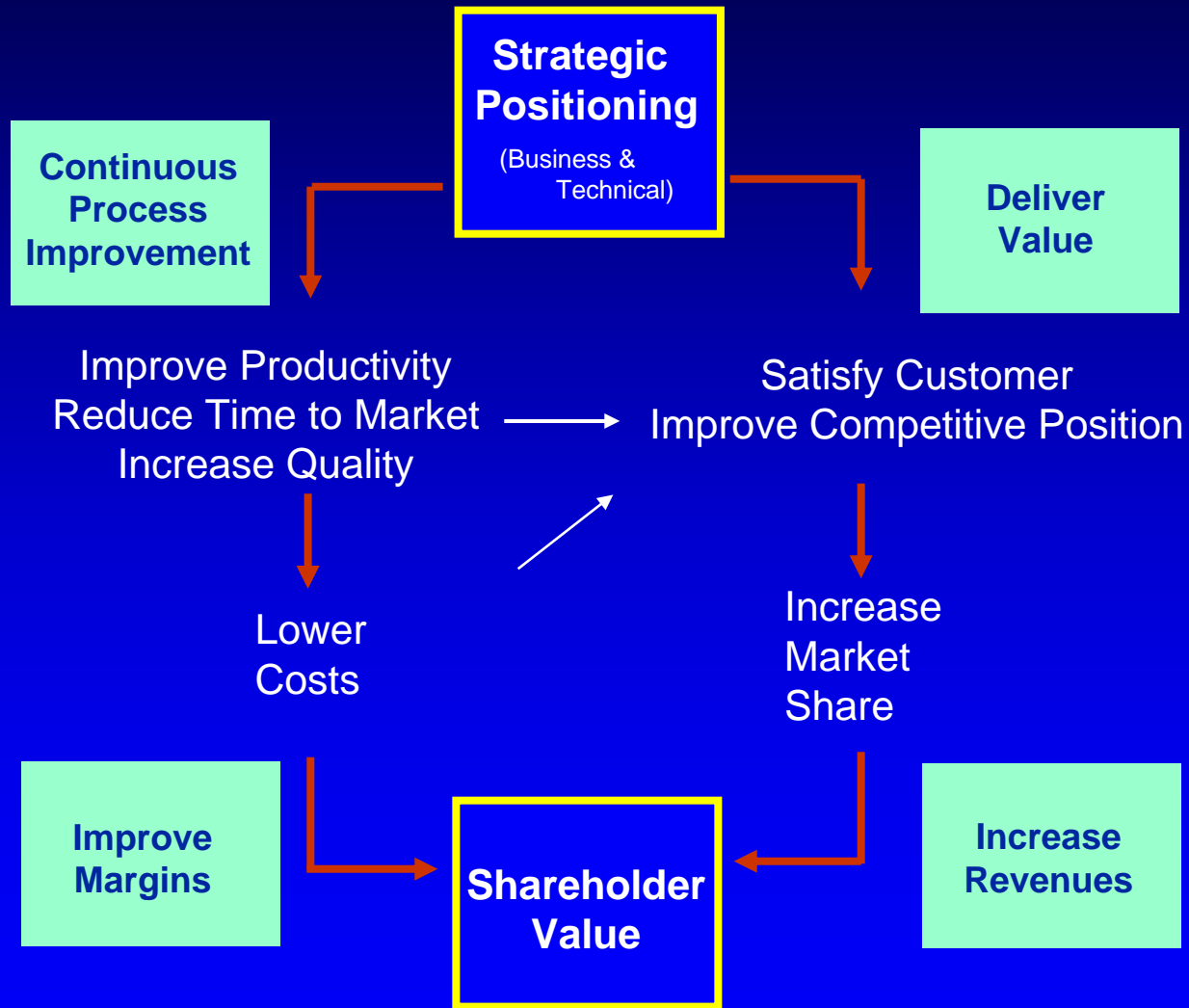
2004 IFPUG Conference

Performance Measurement of Software Application Development & Maintenance

The David Consulting Group
www.davidconsultinggroup.com

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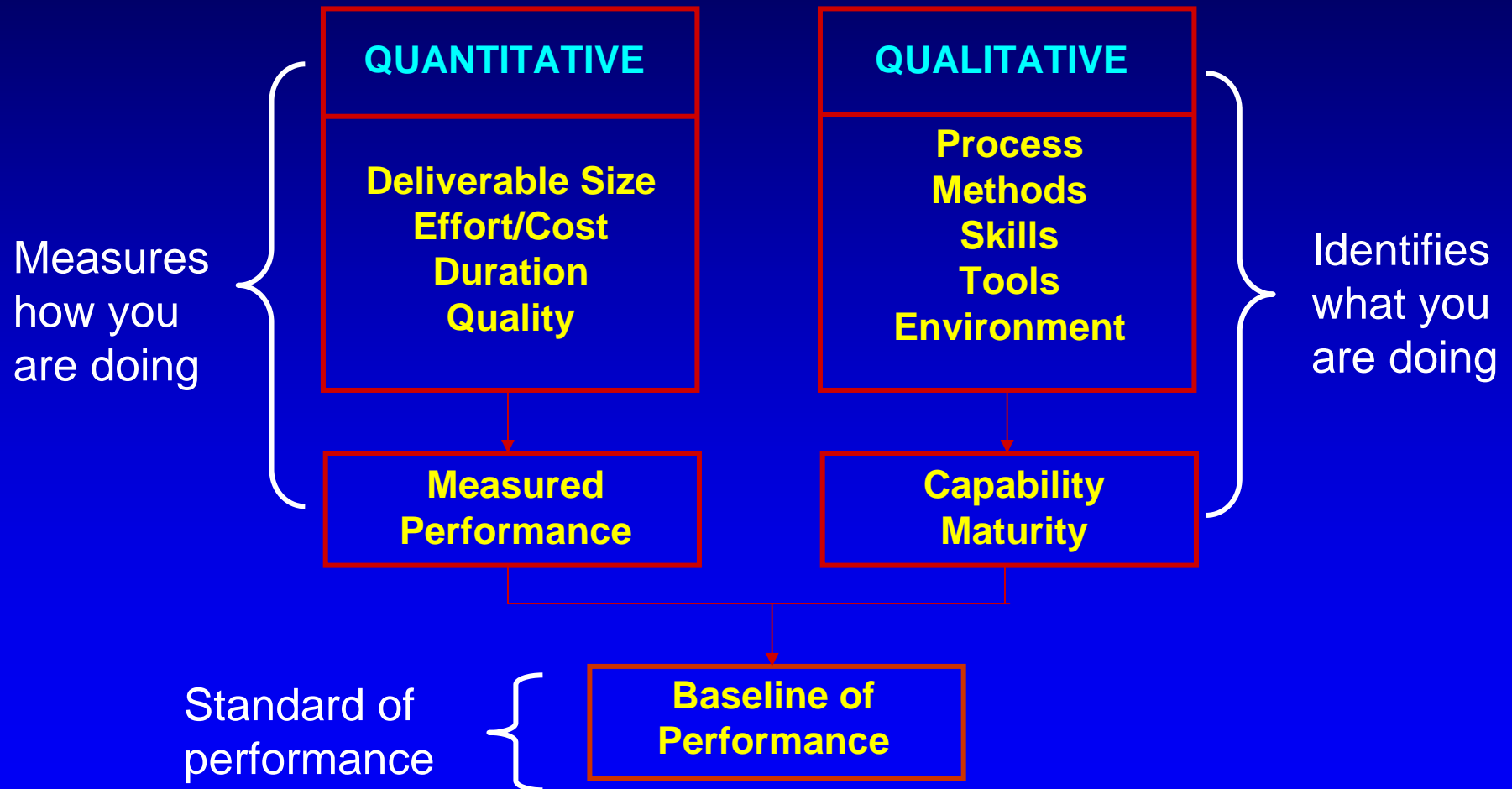
Measurement Must Consider



Presentation Topics

- Measurement for Process Improvement
- Baseline your Performance
- Model Performance Improvements

Measurement for Process Improvement



What Gets Measured?

Business Related Measures

- Unit Delivery Cost
- Time To Market
- Customer Satisfaction

Process Related Measures

- Effectiveness
- Integration
- Compliance

Project Related Measures

- Project Tracking
- Estimating
- Change Management

Contribution

Measures the impact of IT on the business

Identifies trends and helps to monitor progress

Effective utilization of measures in a pro-active format

Keys to Measurement Program

- Measure From User Viewpoint
- Base Metrics on the Goals of the Process Being Measured
- Keep Measures Simple & Flexible

Utilize Results in Decision Making

- Improvements resulting from current and future initiatives must be measured
- The basis for measuring improvements may include:
 - ◆ Industry data
 - ◆ Organizational baseline data
- It is necessary for the organization to put a “**stake in the ground**” relative to current performance level in order to improve development practices

Presentation Topics

- Measurement for Process Improvement
- Baseline your Performance
- Model Performance Improvements

Baseline Activities

- Identify sample set (typically project oriented)
- Collect baseline data
 - ◆ Project measures (e.g., effort, size, cost, duration, defects)
 - ◆ Project attributes (e.g., skill levels, tools, process, etc.)
- Analyze data
 - ◆ Performance comparisons (identification of process strengths and weaknesses)
 - ◆ Industry averages and best practices
 - ◆ Performance modeling (identify high impact areas)
- Report results

Identify Sample Set & Collect Data

Research

MEASURES

Software Size
Level of Effort
Time to Market
Delivered Defects
Cost

CHARACTERISTICS

Skill Levels
Automation
Process
Management
User Involvement
Environment

Analysis

PERFORMANCE LEVELS

PROFILES

Results

- Correlate Performance Levels to Characteristics
- Substantiate Impact of Characteristics
- Identify Best Practices

Quantitative Data

Project	Start Date	End Date	FP	Effort (Mths)	Schedule (Months)	Cost	Delivered Defects
Project abc	8/18/03	1/9/04	122	24.08	4.75	\$375,600	17
Project xyz	3/15/03	12/10/03	111	8.63	8.75	\$134,640	1
Project 123	5/27/02	5/9/03	83	25.77	11.50	\$401,958	3
Project 890	8/15/03	10/19/03	52	5.50	2.25	\$85,800	0

Project data is collected for:

Start and end date – duration

Size – expressed in function points

Effort – labor

Defects – pre and post implementation

Analyze Project Attributes

MANAGEMENT

- Team Dynamics
- High Morale
- Project Tracking
- Project Planning
- Automation
- Management Skills

DEFINITION

- Clearly Stated Requirements
- Formal Process
- Customer Involvement
- Experience Levels
- Business Impact

DESIGN

- Formal Process
- Rigorous Reviews
- Design Reuse
- Customer Involvement
- Experienced Development Staff
- Automation

BUILD

- Code Reviews
- Source Code Tracking
- Code Reuse
- Data Administration
- Computer Availability
- Experienced Staff
- Automation

TEST

- Formal Testing Methods
- Test Plans
- Development Staff Experience
- Effective Test Tools
- Customer Involvement

ENVIRONMENT

- New Technology
- Automated Process
- Adequate Training
- Organizational Dynamics
- Certification

Software Practices Profile

Profile scores reflect the “goodness” of the development practices for a given project. Six categories are evaluated and scored. The higher the score the higher the probability of a successful delivery.

<u>Project</u>	<u>Profile Score</u>	<u>Mgmt</u>	<u>Def</u>	<u>Des</u>	<u>Build</u>	<u>Test</u>	<u>Env</u>
Project 1	75.9	84.09	76.92	77.27	65.38	81.25	65.38
Project 2	60.3	68.18	64.10	56.82	61.54	59.38	50.00
Project 3	60.0	61.36	33.33	81.82	57.69	65.63	65.38
Project 4	54.5	61.36	64.10	45.45	61.54	50.00	42.31
Project 5	39.4	68.18	20.51	50.00	53.85	25.00	46.15
Project 6	35.3	38.64	20.51	15.91	69.23	43.75	38.46
Project 7	31.4	36.36	30.77	4.55	42.31	43.75	46.16

Strengths And Opportunities

(An Example)

Definition

Strengths

- Requirements are clearly stated and stable
- Development and customers are experienced in applications

Opportunities for Improvement

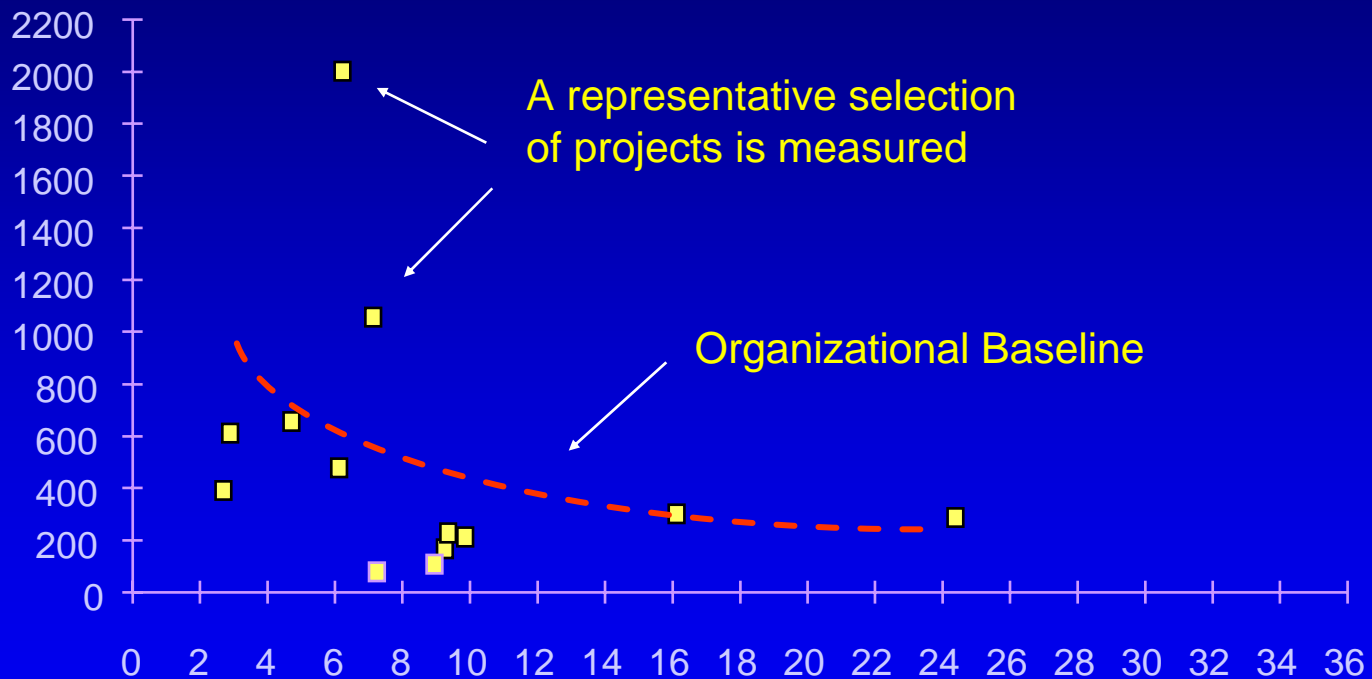
- More formal requirements gathering process on larger projects
- More consistent use of prototyping on larger projects
- A formal review process

Establish A Baseline

Size is expressed in terms of functionality delivered to the user

Software Size

Performance Productivity



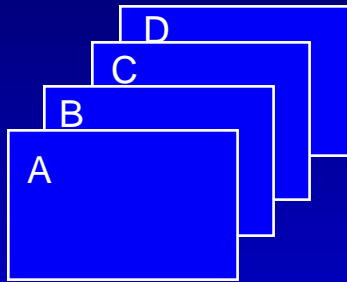
Rate of delivery is a measure of productivity

Rate of Delivery
Function Points per Person Month

Baseline Data Measures Performance

CUSTOMER

Product Deliverable



FUNCTIONALITY DELIVERED

Business Value
Operational Efficiency
Ability to Compete
Customer Satisfaction

IT

Performance Indicators

Functional Size
Duration
Cost
Quality



PRODUCTIVITY MEASURES

Delivery Rate
Time to Market
Cost per Unit of Work
Defect Density

Industry Baselines

Average and Best in Class Performance Levels



COMPARATIVE ANALYSIS

Performance Comparison
Identification of Risks
Profile of Performance
Best Practices Identification

Evaluating Performance Without Size

Project	Cost (000's)	Quality (Defects Released)
PO Special	\$500	12
Vendor Mods	\$760	18
Pricing Adj.	\$ 40	5
Store Sys.	\$990	22

Which project produced the best results?

Evaluating Performance With Size

Project	Size	Cost (000's)	Rate	Quality (Defects Released)	Density
PO Special	250	\$500	\$2,000	12	.048
Vendor Mods	765	\$760	\$ 993	18	.023
Pricing Adj.	100	\$ 80	\$ 800	5	.050
Store Sys.	1498	\$990	\$ 660	22	.014

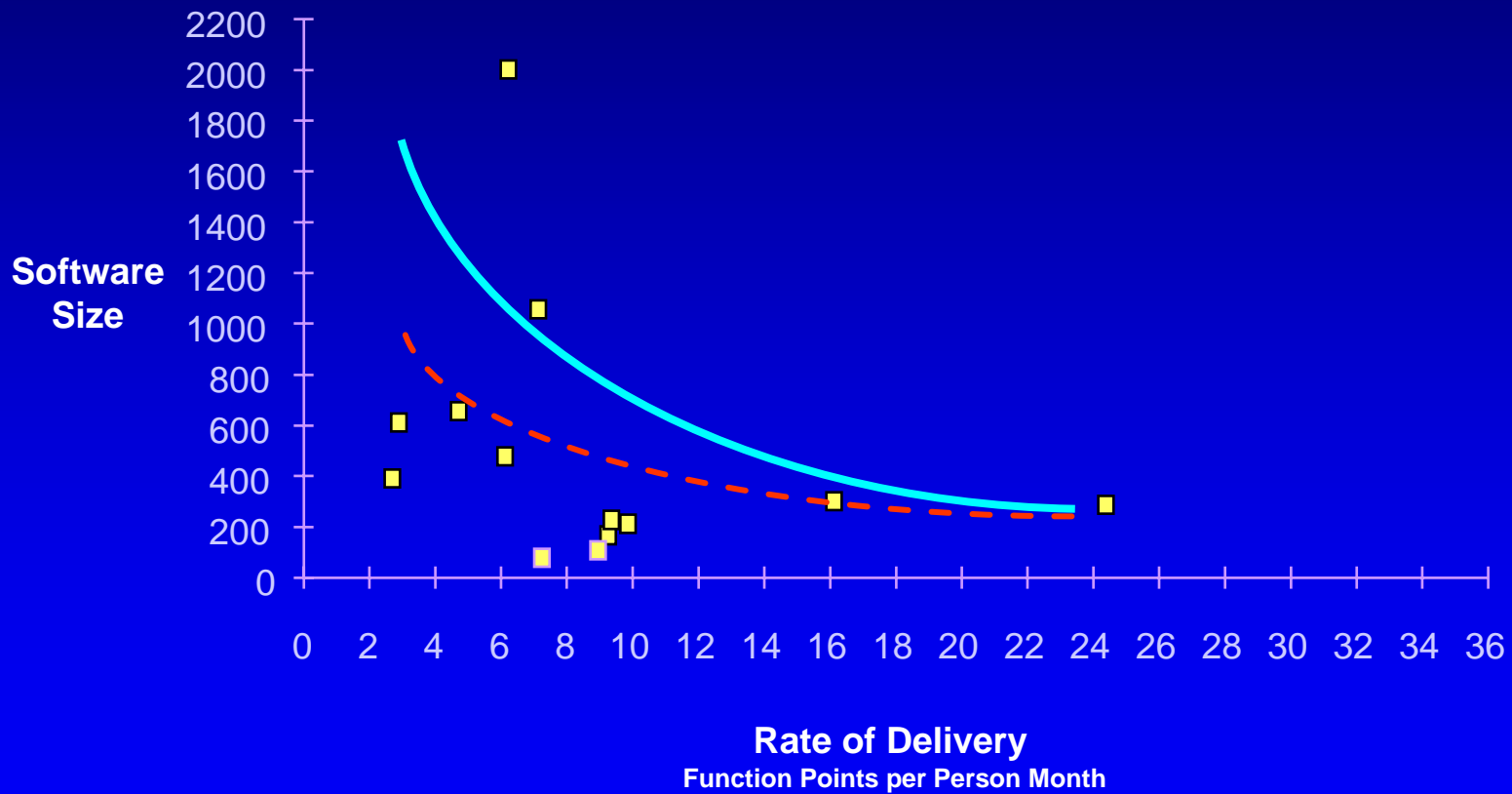
Size --- Function Points

Rate --- Cost per Function Point

Density -- Defects per FP

Compare to Industry Benchmarks

Industry baseline performance



Function Points Per Person Month

Average of Recent Projects Across
Different Platforms

Client Server	17
Main Frame	13
Web	25
e-business Web	15
Vendor Packages	18
Data Warehouse	9

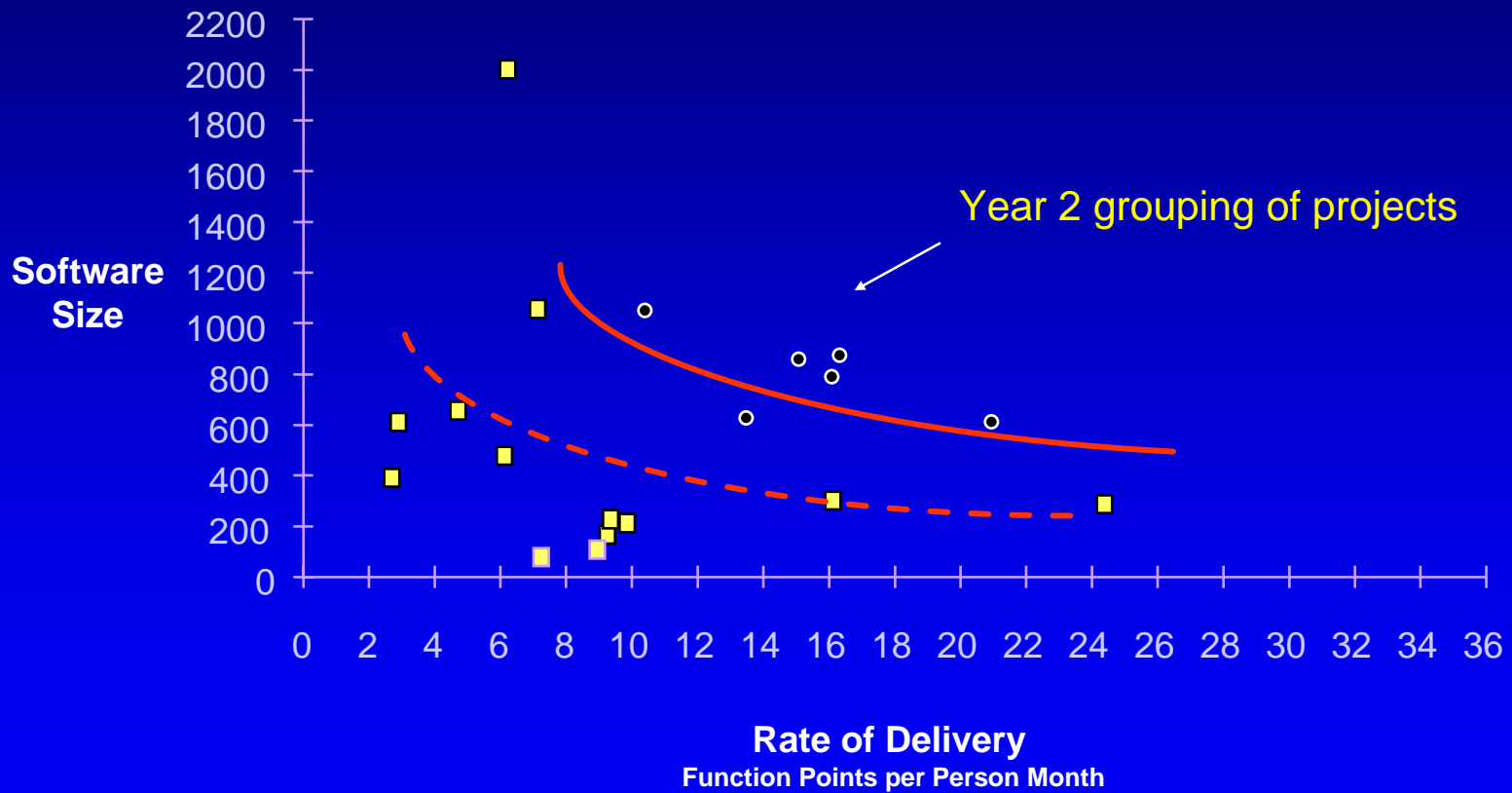
Function Points Supported By One FTE

Average of Support Provided for
Corrective Maintenance by One FTE

Client Server	642
Main Frame	978
Web	756
e-business Web	438
Vendor Packages	740
Data Warehouse	392

Track Improvements

Track Progress



Presentation Topics

- Measurement for Process Improvement
- Baseline your Performance
- Model Performance Improvements

Model Improvements

- ❑ Model the impact of implementing selected process improvements
- ❑ Evaluate the impact on productivity
- ❑ Modeling is performed from several perspectives: Management Improvements, Design Improvements, Definition Improvements, Build Improvements, Test Improvements, Environment Improvements and SEI CMM Specific Improvements

EXAMPLE: Improvements are measured from the following baseline --

Average Project Size:	133 Function Points (FPs)
Average Productivity:	10.7 FP/Effort Month (EM)
Average Time-to-Market:	7.3 Months
Average Cost/FP:	\$934.58
Projected Delivered Defects/FP:	.0301

Modeled Improvements

Current improvement initiatives (SEI) are appropriately targeted at the majority of “weak spots” revealed by the baseline results.

Perspective	Productivity	Time-To-Market	Defects/FP	Cost/FP
Management	8.10%	0.00%	0.00%	-7.44%
Definition	16.20%	0.00%	0.00%	-15.70%
Design	30.80%	-25.00%	-25.00%	-23.55%
Build	10.70%	0.00%	0.00%	-9.67%
Test	24.40%	-25.00%	-25.00%	-20.25%
Environment	5.30%	0.00%	0.00%	-5.04%
SEI CMM Specific	131.50%	-50.00%	-75.00%	-56.78%
All	169.20%	-50.00%	-75.00%	-62.89%

	Baseline Productivity	SEI Productivity Improvements
Average Project Size	133	133
Average FP/EM	10.7	24.8
Average Time-To-Market (Months)	7.3	3.7
Average Cost/FP	\$934.58	\$467.29
Projected Delivered Defects/FP	0.0301	0.0075

Strive for Continuous Improvement

