



Metrics-Based Process Mapping

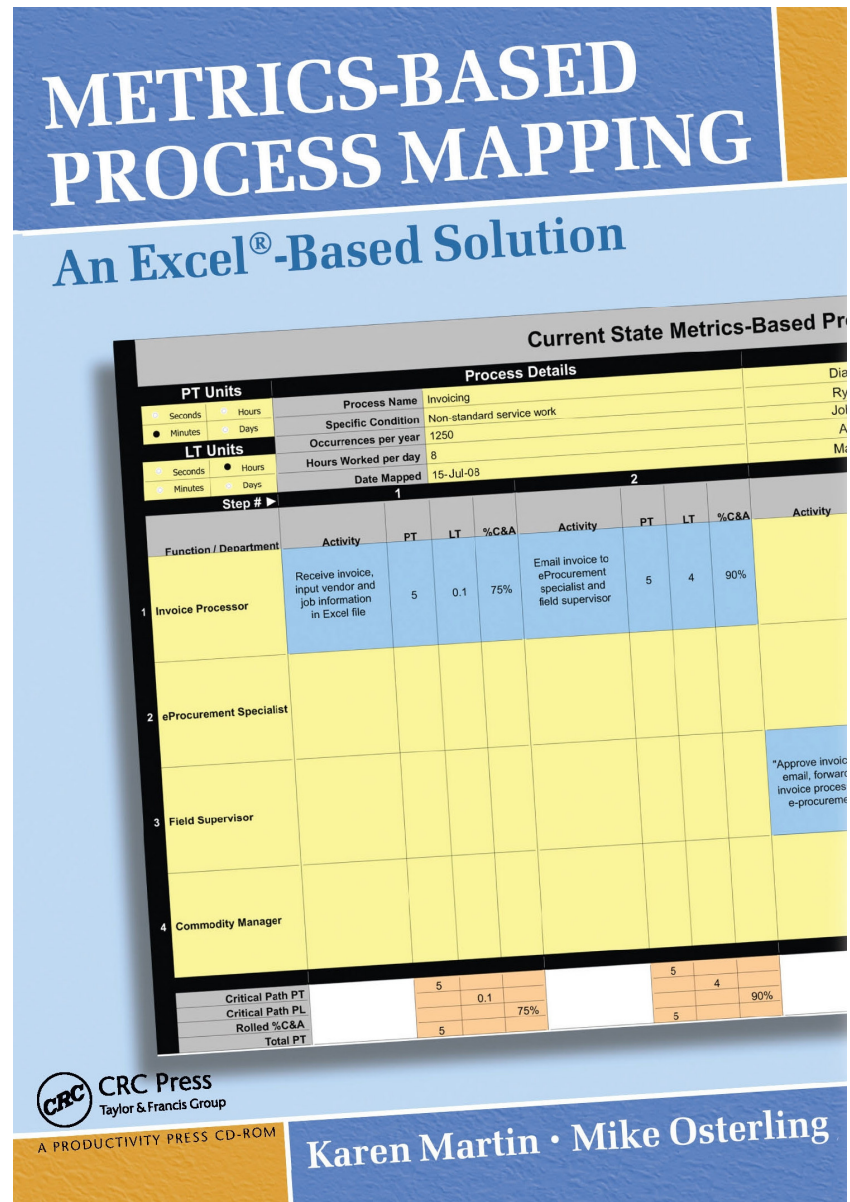
**Excel-Based Tool for Mapping
Non-Manufacturing Processes**

***Just Released from
Productivity Press***

**A process mapping tool
from Karen Martin &
Mike Osterling**

Authors of

***The Kaizen Event Planner:
Achieving Rapid Improvement in
Office, Service, and Technical
Environments***





Metrics-Based Process Mapping (MBPM): What is it?

- Structured method for process analysis and design, documenting standard work, and monitoring expected performance levels.
- Visual methodology that integrates key time and quality metrics into conventional cross-functional process maps.

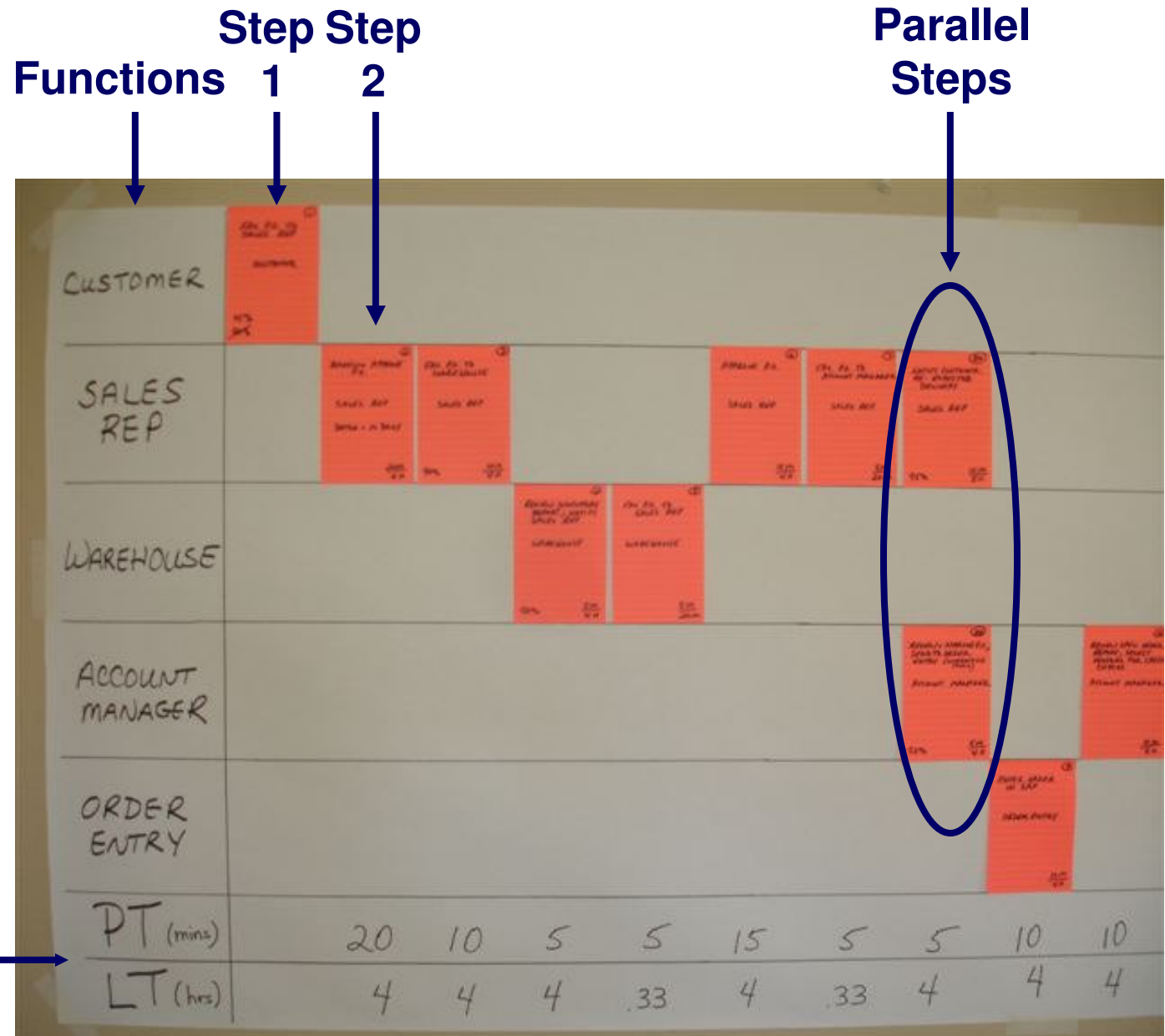


Metrics-Based Process Mapping (MBPM): Why use it?

- An effective tool for supporting lean transformations in office, service, and knowledge work environments.
- Fills a void with existing process mapping techniques
- An easy-to-use tool that facilitates:
 - Gaining a deeper understanding of specific causes for the macro-level waste identified on a value stream map
 - Designing tactical-level improvements
- Enables data-based decisions

MBPM Structure

Timeline





Steps for Creating the MBPM

- Document the current process
 - Step 1: Document each activity and handoff(s)
 - Step 2: Add key metrics (time and quality) & barriers to flow (e.g. batching, equipment downtime, shared resources, etc.)
 - Step 3: Define the critical path
 - Step 4: Create the timeline
 - Step 5: Calculate summary metrics
 - Step 6: Label value-adding (VA) and necessary non-value adding (N) steps (unlabeled steps are deemed waste)
- Identify root causes for the waste & other barriers to flow, and countermeasures to eliminate root causes
- Design the future state & calculate projected metrics



Why Capture the MBPM Electronically?

- Archive the team's work
- Distribute the maps to remote locations
- Document the new standard work for the process
 - Training/retraining staff
 - Monitoring process performance
- Communicate the impact of Kaizen Events and other improvement activities

Product Information

- The CD contains three files:
 - **Mapping Essentials.pdf** – describes the step-by-step approach for creating MBPMs manually, using paper and post-its
 - **User's Guide.pdf** – describes the tool's functionality and the steps to creating electronic versions of the MBPMs
 - **MBPM.xlt** – the Excel-based tool
 - Including a **Quick Start Guide** for mature Excel users and those who already know how to create MBPMs





The Excel-Based Tool: Easy to Use

- Intuitive design
- Custom tool bar and pull-down menus
- Color-coded cells
- Automated metrics calculations
- Mistake-proofing audit feature
- Easily distribute electronic “read only” versions of the process flow to non-licensed users

Tool Layout

Custom
toolbar with
easy to use
pull-down
menus

Seven sheets

- Current State
- Future State
- Summary Metrics
- Audit Findings
- Metrics Descriptions
- Sample MBPM
- Quick Start Guide

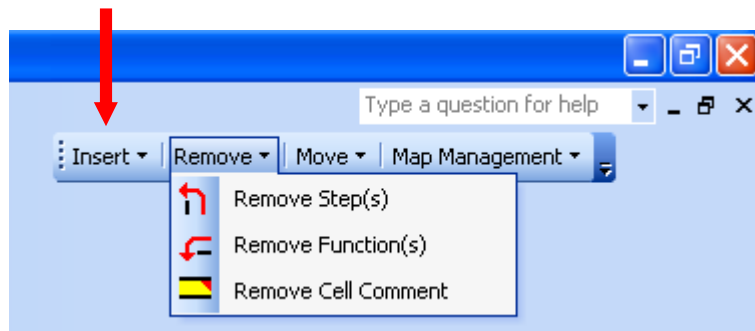
The screenshot displays the Microsoft Excel interface for a file named 'MBPM.xls'. A custom toolbar is located below the standard menu bar, featuring pull-down menus for 'Insert', 'Remove', 'Move', and 'Map Management'. The spreadsheet content is titled 'Current State Metrics-Based Process Map' and is organized into several sections:

- PT Units:** Radio buttons for Seconds, Hours, Minutes, and Days.
- Process Details:** Fields for Process Name, Specific Conditions, Occurrences per Year, Hours Worked per Day, and Date Mapped.
- LT Units:** Radio buttons for Seconds, Hours, Minutes, and Days.
- Step #:** A dropdown menu set to 1.
- Function / Department:** A dropdown menu set to 'ENTER NEW FUNCTION OR DEPARTMENT'.
- Activity:** A large table with columns for Activity, PT, LT, and %C&A, repeated for four steps.
- Summary Metrics:** A section at the bottom with rows for Critical Path PT, Critical Path LT, Rolled %C&A, and Total PT.

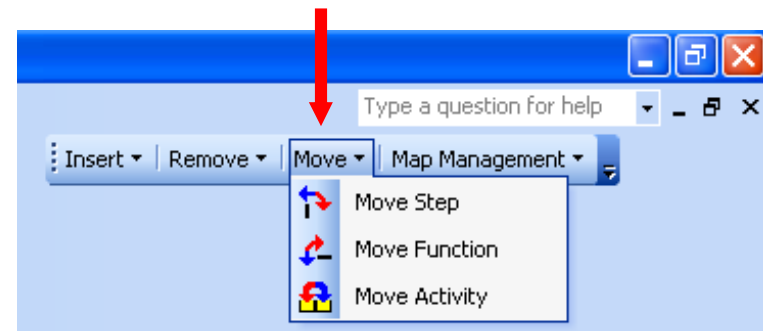
The sheet tab bar at the bottom shows seven sheets: 'Current State', 'Future State', 'Summary Metrics', 'Audit Findings', 'Metrics Descriptions', 'Sample MBPM', and 'Quick Start Guide'. The 'Current State' sheet is currently selected.

Custom Toolbar Features

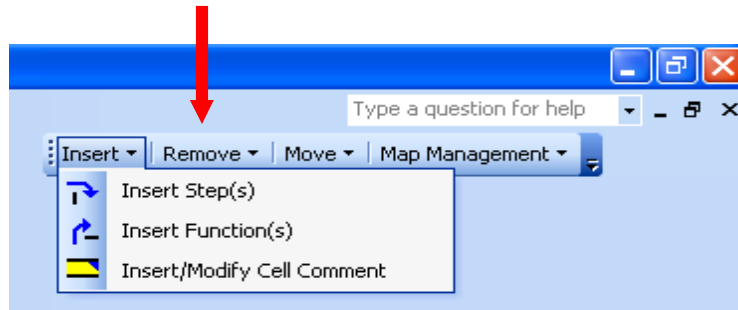
Insert



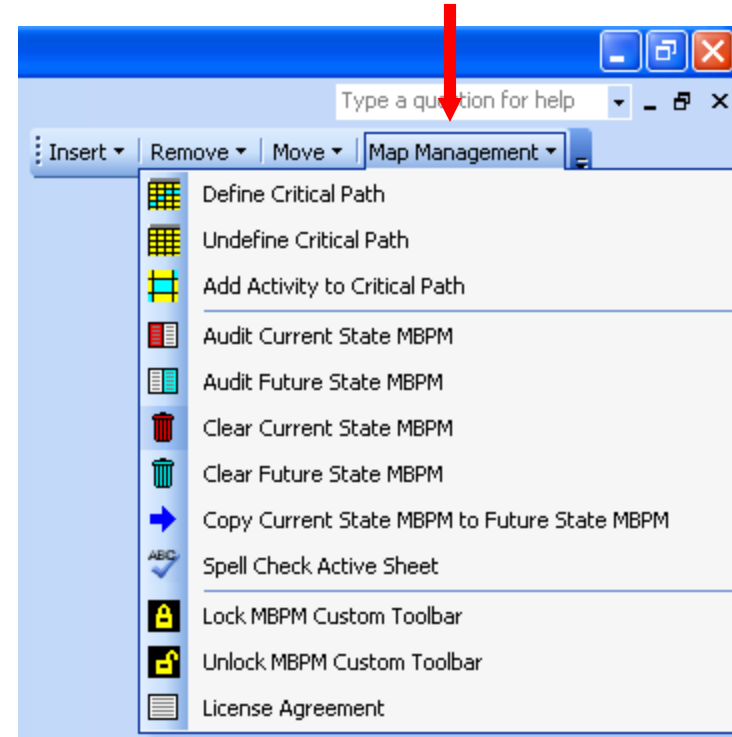
Move



Remove



Map Management



Color-Coded Cells Indicate Function

- Yellow – accepts user data entry
- Salmon / tan – auto-populates
- Black/gray/white – column/row labels & blank space

Step # ▶	1				2				3				4			
Function / Department	Activity	PT	LT	%C&A	Activity	PT	LT	%C&A	Activity	PT	LT	%C&A	Activity	PT	LT	%C&A
ENTER NEW FUNCTION OR DEPARTMENT																
ENTER NEW FUNCTION OR DEPARTMENT																
Critical Path PT																
Critical Path LT																
Rolled %C&A																
Total PT																

Color-Coded Summary Metrics Sheet

Summary Metrics							0 Decimal Places
							1 Decimal Place
							2 Decimal Places
Predefined Performance Metrics							
Metric	Current State		Projected Future State		Desired Direction		Projected Improvement
	Value	Units	Value	Units	Up	Down	
Critical Path PT Sum	140.0	minutes	45.0	minutes		⬤	67.9%
Critical Path LT Sum	38.7	hours	14.2	hours		⬤	63.3%
Activity Ratio	6.0	%	5.3	%	⬤		-11.7%
Rolled First Pass Yield	21.4	%	75.3	%	⬤		251.9%
# of Activities	16	activities	8	activities		⬤	50.0%
Capacity Calculations							
Metric	Current State		Projected Future State				Projected Change
	Value	Units	Value	Units			
Sum of Total PTs	155.0	minutes	45.0	minutes			-71.0%
Occurrences per Year	37500	occurrences	37500	occurrences			0.0%
Available Work Hours per Year	1950	hours	1950	hours			0.0%
Labor Requirements	49.7	FTEs	14.4	FTEs	-71.0%		
User-defined Performance Metrics							
Metric	Current State		Projected Future State		Desired Direction		Projected Improvement
	Value	Units	Value	Units	Up	Down	
Number of reviews & approvals	4.0	reviews	1.0	review	○	⬤	75.0%
					○	○	

■ Auto-Calculates:

- Summary time and quality metrics for before and after maps
- Projected % improvement (color-coded for visual ease)
- Staffing requirements
- User-defined metrics

Map Structure

Functions

Process Steps

Current State Metrics-Based Process Map																					
PT Units		Process Details								Mapping Team											
<input type="radio"/> Seconds	<input type="radio"/> Hours	Process Name		Order Fulfillment						Diane O'Shea				Ryan Austin							
<input checked="" type="radio"/> Minutes	<input type="radio"/> Days	Specific Conditions		Domestic orders through sales force						Sean Michaels				Mary Townsend							
LT Units		Occurrences per Year		37,500						Sam Parks											
<input type="radio"/> Seconds	<input checked="" type="radio"/> Hours	Hours Worked per Day								Sally Dampier								Facilitator			
<input type="radio"/> Minutes	<input type="radio"/> Days	Date Mapped		25-Jun-08						Michael Prichard								Dave Morgan			
Step # ▶		1			2			3			4			5							
Function / Department		Activity	PT	LT	%C&A	Activity	PT	LT	%C&A	Activity	PT	LT	%C&A	Activity	PT	LT	%C&A	Activity	PT	LT	%C&A
1	Customer	Fax PO to Sales Rep	0	0	45%																
2	Sales Rep					Review PO; clarify with customer as needed	20	2	90%	Fax PO to warehouse	10	4	90%								
5	Finance																				
6	Warehouse / Shipping													Check inventory levels; notify Sales Rep re: status	5	4	95%	Fax PO to Sales Rep	5	0.33	90%
Critical Path PT			0				20				10				5				5		
Critical Path LT				0				2				4				4				0.33	
Rolled %C&A					45%				90%				90%				95%				90%
Total PT			0				20				10				5				5		

Key Metrics & Timeline

Blue color-coded cells indicate the critical path



Archiving your MPBM

5 Easy Steps

1. Enter header information
2. Insert functions and steps
3. Create the current state map
 - Enter activities & key metrics
 - Define the critical path
 - Audit the map
4. Create the future state map
 - Enter activities & key metrics
 - Define the critical path
 - Audit the map
5. View the Summary Metrics Sheet

Step 1

Enter Header Information

Current State Metrics-Based Process Map

PT Units		Process Details		Mapping Team	
<input type="radio"/> Seconds	<input type="radio"/> Hours	Process Name	Order Fulfillment	Diane O'Shea	Ryan Austin
<input checked="" type="radio"/> Minutes	<input type="radio"/> Days	Specific Conditions	Domestic orders through sales force	Sean Michaels	Mary Townsend
LT Units		Occurrences per Year	37,500	Sam Parks	
<input type="radio"/> Seconds	<input checked="" type="radio"/> Hours	Hours Worked per Day	8	Sally Dampier	
<input type="radio"/> Minutes	<input type="radio"/> Days	Date Mapped	25-Jun-08	Michael Prichard	

Define the
units of
measure
being used

Step 2A

Insert Functions and Steps

The screenshot shows a Microsoft Excel spreadsheet titled "Current State Metrics-Based Process Map". The spreadsheet is divided into several sections: "PT Units", "Process Details", and "Mapping Team". The "Process Details" section includes fields for "Process Name", "Specific Conditions", "LT Units", "Currencies per Year", "Hours Worked per Day", and "Date Mapped". The "Mapping Team" section lists team members and their roles. Below these sections is a table with columns for "Function / Department", "Activity", "PT", "LT", "%C&A", and "Activity". The first row of this table shows "Customer" as the function and "Fax PO to Sales Rep" as the activity.

A red circle highlights the "Insert" menu in the Excel ribbon, which is open, showing options: "Insert Step(s)", "Insert Function(s)", and "Insert/Modify Cell Comment".

The "Insert Step(s)" dialog box is open, asking "How many steps would you like to insert?". The input field contains the number "4". Below this, it asks "After which existing step number would you like to insert the new step(s)?" with instructions: "- Enter '0' or 'beg' to insert at the beginning of the map." and "- Enter the last existing step number or 'end' to insert at the end of the map." The input field contains the number "2". An "Insert" button is at the bottom right of the dialog box.

Step 2B

Enter Function Names

PT Units		Process			
<input type="radio"/> Seconds	<input type="radio"/> Hours	Process Name	Order Fulfillment		
<input checked="" type="radio"/> Minutes	<input type="radio"/> Days	Specific Conditions	Domestic orders		
LT Units		Occurrences per Year	37,500		
<input type="radio"/> Seconds	<input checked="" type="radio"/> Hours	Hours Worked per Day	8		
<input type="radio"/> Minutes	<input type="radio"/> Days	Date Mapped	25-Jun-08		
Step # ▶		1			
Function / Department	Activity	PT	LT	%C&A	
1 Customer	Fax PO to Sales Rep	0	0	45%	
2 Sales Rep					
3 Account Manager					

Step 3A

Enter Activities and Key Metrics

PT Units		Process			
<input type="radio"/> Seconds	<input type="radio"/> Hours	Process Name	Order Fulfillment		
<input checked="" type="radio"/> Minutes	<input type="radio"/> Days	Specific Conditions	Domestic orders		
LT Units		Occurrences per Year	37,500		
<input type="radio"/> Seconds	<input checked="" type="radio"/> Hours	Hours Worked per Day	8		
<input type="radio"/> Minutes	<input type="radio"/> Days	Date Mapped	25-Jun-08		
Step # ▶		1			
Function / Department		Activity	PT	LT	%C&A
1 Customer		Fax PO to Sales Rep	0	0	45%

Key metrics

- Process Time (PT)
- Lead Time (LT)
- Percent Complete & Accurate (%C&A)

Step 3B

Define the Critical Path

The screenshot shows a software interface for defining a critical path. The main window displays a process map with columns for Function / Department, Activity, PT, LT, and %C&A. The process is divided into steps 5, 6, 7, and 8. A red circle highlights the 'Map Management' menu, which includes options like 'Define Critical Path', 'Undefine Critical Path', 'Add Activity to Critical Path', 'Audit Current State MBPM', 'Audit Future State MBPM', 'Clear Current State MBPM', 'Clear Future State MBPM', 'Copy Current State MBPM to Future State MBPM', 'Spell Check Active Sheet', 'Lock MBPM Custom Toolbar', 'Unlock MBPM Custom Toolbar', and 'License Agreement'. A red circle also highlights the 'Define Critical Path' dialog box, which prompts the user to select a function for defining the critical path for step 8. The dialog box lists two options: '2 - Notify Customer when they can expect delivery: LT = 5' and '3 - Review and approve PO; send to Order Entry: LT = 4'. The user has selected option 3.

Define Critical Path

Which function would you like to use in defining the critical path for step 8:

- 2 - Notify Customer when they can expect delivery: LT = 5
- 3 - Review and approve PO; send to Order Entry: LT = 4

3

Map Management

- Define Critical Path
- Undefine Critical Path
- Add Activity to Critical Path
- Audit Current State MBPM
- Audit Future State MBPM
- Clear Current State MBPM
- Clear Future State MBPM
- Copy Current State MBPM to Future State MBPM
- Spell Check Active Sheet
- Lock MBPM Custom Toolbar
- Unlock MBPM Custom Toolbar
- License Agreement

Pop-up prompts user to select critical path when parallel activities are present

The Critical Path: Blue Color-Coding

Step # ▶		6				7				8				9				10			
Function / Department		Activity	PT	LT	%C&A	Activity	PT	LT	%C&A	Activity	PT	LT	%C&A	Activity	PT	LT	%C&A	Activity	PT	LT	%C&A
2	Sales Rep	Approve PO	15	4	100%	Fax PO to Account Manager	5	0.33	100%	Notify Customer when they can expect delivery	15	5	95%								
3	Account Manager									Review and approve PO; send to Order Entry	5	4	100%								
4	Order Entry													Enter order into SAP	10	4	80%				
5	Finance																	Run "open order" report; ID customers needing credit checks	10	4	100%
Critical Path PT			15				5				5				10				10		
Critical Path LT				4				0.33				4				4				4	
Honored %C&A					100%				100%				95%				80%				100%
Total PT			15				5				10				10				10		

Critical path metrics auto-populate timeline

Step 3C

Audit the Map

The screenshot shows a software window titled 'Current State Metrics-Based Process Map'. The interface includes a menu bar with 'Window' and 'Help', a toolbar with various icons, and a 'Map Management' dropdown menu. The dropdown menu is open, showing several options. The option 'Audit Current State MBPM' is circled in red. Below the menu, there is a table with columns for 'Activity', 'PT', 'LT', and '%C&A'. The table is divided into three sections labeled 2, 3, and 4. The 'Mapping Team' section lists names: Diane O'Shea, Sean Michaels, Sam Parks, Sally Dampier, and Michael Prichard. Ryan Austin and Mary Townsend are also listed. The table contains yellow cells for activities and blue cells for metrics.

Current State Metrics-Based Process Map			
Mapping Team			
Diane O'Shea			
Sean Michaels			
Sam Parks			
Sally Dampier			
Michael Prichard			
Ryan Austin			
Mary Townsend			

Map Management dropdown menu options:

- Define Critical Path
- Undefine Critical Path
- Add Activity to Critical Path
- Audit Current State MBPM**
- Audit Future State MBPM
- Clear Current State MBPM
- Clear Future State MBPM
- Copy Current State MBPM to Future State MBPM
- Spell Check Active Sheet
- Lock MBPM Custom Toolbar
- Unlock MBPM Custom Toolbar
- License Agreement

Defined map requirements must be met to generate summary metrics

MBPM Audit Findings		
	Current State MBPM Findings	Future State MBPM Findings
1		
2		
3	1. Hours Worked per Day must contain numerical data.	1. Future State map has not been audited.
4	2. Step 1, Function 1: PT value must be a number greater than or equal to 0.	
5	3. Step 2, Function 1: %C&A value must be between 0% and 100%.	
6	4. Step 4, Function 2: PT value must be a number greater than or equal to 0.	
7	5. Step 8: must be added to the critical path.	
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		

Navigation: Current State / Future State / Summary Metrics / **Audit Findings** / Metrics Descriptions / Sample MBPM / Quick Start Guide

ences per Year	37,500	Sam Parks
Worked per Day	8	Sally Dampier
Date Mapped	25-Jun-08	Michael Prichard

1

Activity	PT	LT	%C&A
to Sales ep	0	0	45%

Microsoft Excel

Congratulations! Your Current State map meets all requirements.

OK

MBPM Audit Findings		
	Current State MBPM Findings	Future State MBPM Findings
1		
2		
3	1. Current State map meets all audit requirements.	1. Future State map has not been audited.
4		
5		
6		
7		
8		

Summary Metrics Auto-Calculate

A	B	C	D	E	F	G	H
Summary Metrics							
0 Decimal Places							
1 Decimal Place							
2 Decimal Places							
Predefined Performance Metrics							
Metric	Current State		Projected Future State		Desired Direction		Projected Improvement
	Value	Units	Value	Units	Up	Down	
Critical Path PT Sum	140.0	minutes				<input checked="" type="radio"/>	
Critical Path LT Sum	38.7	hours				<input checked="" type="radio"/>	
Activity Ratio	6.0	%			<input checked="" type="radio"/>		
Rolled First Pass Yield	21.4	%			<input checked="" type="radio"/>		
# of Activities	16	activities				<input checked="" type="radio"/>	
Capacity Calculations							
Metric	Current State		Projected Future State				Projected Change
	Value	Units	Value	Units			
Sum of Total PTs	155.0	minutes					
Occurrences per Year	37500	occurrences					
Available Work Hours per Year	1950	hours					
Labor Requirements	49.7	FTEs					
User-defined Performance Metrics							
Metric	Current State		Projected Future State		Desired Direction		Projected Improvement
	Value	Units	Value	Units	Up	Down	
Number of reviews & approvals	4.0	reviews			<input type="radio"/>	<input checked="" type="radio"/>	
					<input type="radio"/>	<input type="radio"/>	
					<input type="radio"/>	<input type="radio"/>	
					<input type="radio"/>	<input type="radio"/>	
Current State / Future State / Summary Metrics / Audit Findings / Metrics Descriptions / Sample MBPM / Quick Start Guide							

Flexible options for desired number of decimal places

Step 4

Create Future State Map

(Start from Scratch or Copy CS to FS)

The screenshot shows a software interface with a menu bar (Window, Help) and a toolbar. The 'Map Management' menu is open, displaying various options. The 'Copy Current State MBPM to Future State MBPM' option is highlighted with a red circle. The background shows a 'Current State Metrics-Based Process Map' with a table of team members and a process map grid.

Current State Metrics-Based Process Map

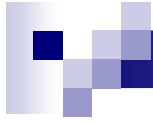
Mapping Team			
Team Lead	Diane O'Shea	Ryan Austin	
Team Member	Sean Michaels	Mary Townsend	
Team Member	Sam Parks		
Team Member	Sally Dampier		
Team Member	Michael Prichard		

Process Map Grid

Activity	PT	LT	%C&A	Activity	PT	LT	%C&A	Activity	PT	LT

Map Management Menu Options:

- Define Critical Path
- Undefine Critical Path
- Add Activity to Critical Path
- Audit Current State MBPM
- Audit Future State MBPM
- Clear Current State MBPM
- Clear Future State MBPM
- Copy Current State MBPM to Future State MBPM
- Spell Check Active Sheet
- Lock MBPM Custom Toolbar
- Unlock MBPM Custom Toolbar
- License Agreement



Step 4 (continued)

Document the Future State Map

- Enter activities and key metrics
- Define the Future State Critical Path
- Audit the Future State Map

Step 5

View the Summary Metrics

Summary Metrics							0 Decimal Places
							1 Decimal Place
							2 Decimal Places
Predefined Performance Metrics							
Metric	Current State		Projected Future State		Desired Direction		Projected Improvement
	Value	Units	Value	Units	Up	Down	
Critical Path PT Sum	140.0	minutes	45.0	minutes		●	67.9%
Critical Path LT Sum	38.7	hours	14.2	hours		●	63.3%
Activity Ratio	6.0	%	5.3	%	●		-11.7%
Rolled First Pass Yield	21.4	%	75.3	%	●		251.9%
# of Activities	16	activities	8	activities		●	50.0%
Capacity Calculations							
Metric	Current State		Projected Future State				Projected Change
	Value	Units	Value	Units			
Sum of Total PTs	155.0	minutes	45.0	minutes			-71.0%
Occurrences per Year	37500	occurrences	37500	occurrences			0.0%
Available Work Hours per Year	1950	hours	1950	hours			0.0%
Labor Requirements	49.7	FTEs	14.4	FTEs			-71.0%
User-defined Performance Metrics							
Metric	Current State		Projected Future State		Desired Direction		Projected Improvement
	Value	Units	Value	Units	Up	Down	
Number of reviews & approvals	4.0	reviews	1.0	review	○	●	75.0%
					○	○	

Color-coded cells based on desired direction for projected improvement

User-Defined Performance Metrics Provide Flexibility

Summary Metrics							0 Decimal Places
							1 Decimal Place
							2 Decimal Places
Predefined Performance Metrics							
Metric	Current State		Projected Future State		Desired Direction		Projected Improvement
	Value	Units	Value	Units	Up	Down	
Critical Path PT Sum	140.0	minutes	45.0	minutes		●	67.9%
Critical Path LT Sum	38.7	hours	14.2	hours		●	63.3%
Activity Ratio	6.0	%	5.3	%	●		-11.7%
Rolled First Pass Yield	21.4	%	75.3	%	●		251.9%
# of Activities	16	activities	8	activities		●	50.0%
Capacity Calculations							
Metric	Current State		Projected Future State				Projected Change
	Value	Units	Value	Units			
Sum of Total PTs	155.0	minutes	45.0	minutes			-71.0%
Occurrences per Year	37500	occurrences	37500	occurrences			0.0%
Available Work Hours per Year	1950	hours	1950	hours			0.0%
Labor Requirements	49.7	FTEs	14.4	FTEs			-71.0%
User-defined Performance Metrics							
Metric	Current State		Projected Future State		Desired Direction		Projected Improvement
	Value	Units	Value	Units	Up	Down	
Number of reviews & approvals	4.0	reviews	1.0	review	○	●	75.0%
					○	○	



Summary

- ***Different than VSM*** – Used to document the *micro-level* current state for a process
- Facilitates the design of an improved future state
- Facilitates measuring and analyzing office, service, and knowledge-work processes in terms of both time ***and*** quality.
- Measures the impact of improvements
- Visual aid for training and monitoring process performance
- Effective tool to record key activities and calculate the impact of Kaizen Events



Licensing Information

- Each CD provides one license only.
 - Licensees may create and/or edit maps.
 - Others may view the maps but may not create new or edit existing maps.
 - The maps may be shared for viewing purposes after using the “Lock Toolbar” feature on the custom toolbar, which disables much of the map’s functionality.

One license
per CD
purchased

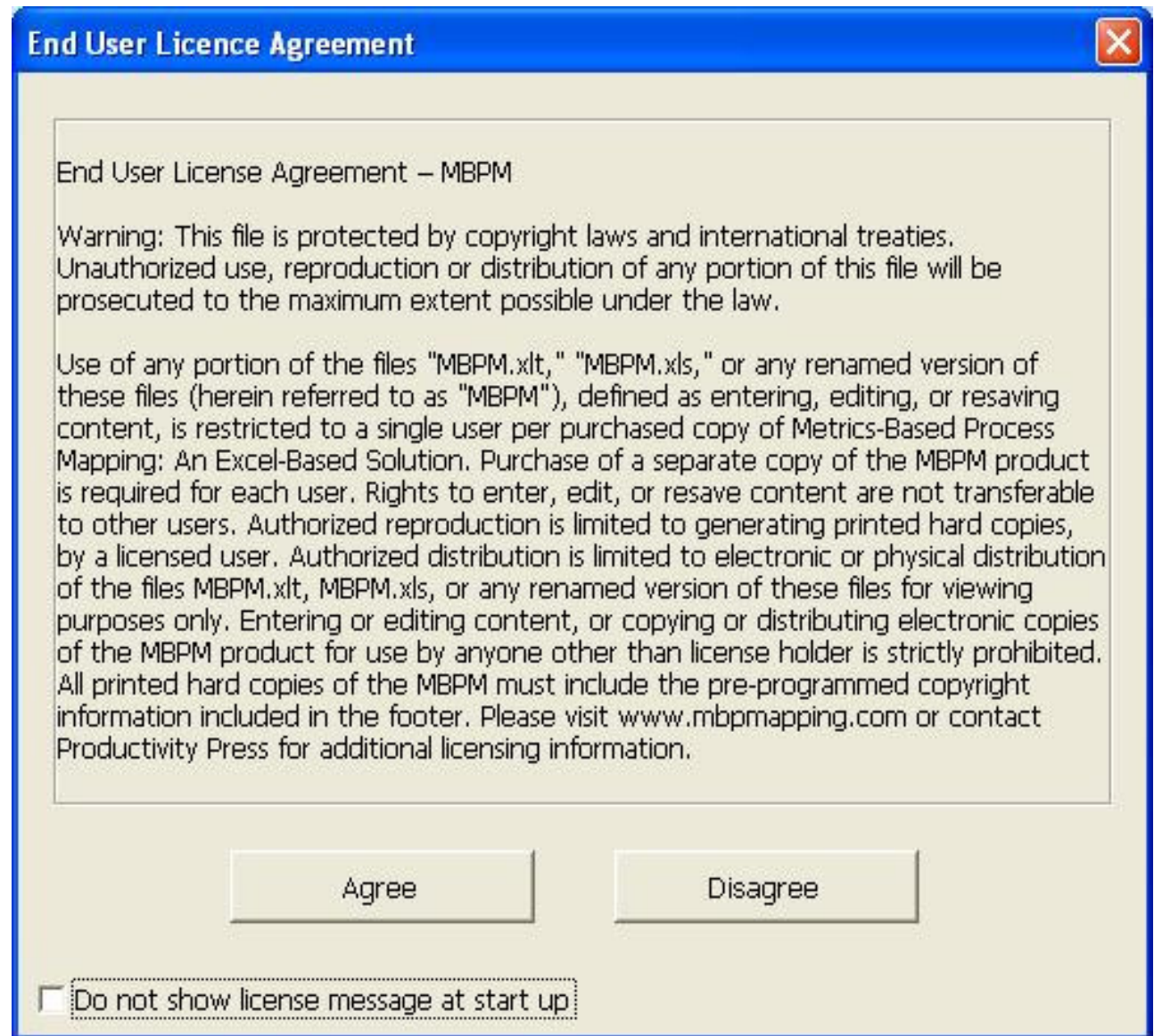
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available for
volume
purchases

5-9 copies = 5%
discount

10-19 copies = 10%
discount

≥20 copies = 15%
discount

For more information,
Contact Chris Manion at
Chris.manion@taylorandfrancis.com





Final Notes

- Must be run on a PC with Excel 2003 or later.
- Detailed information for creating metrics-based process maps can be found in:
 - Chapter 12 of ***The Kaizen Event Planner: Achieving Rapid Improvements in Office, Service, and Technical Environments***, Productivity Press, October 2007.
 - *Mapping Essentials* and *User's Guide* included with ***Metrics-Based Process Mapping: An Excel-Based Solution***, Productivity Press, July 2008.
 - www.mbpmapping.com



For Further Information

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