

Enterprise Schedule Analysis

Fuse Metric Development

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Agenda

- Introduction to project metrics
 - Industry standards & Acumen libraries
 - Application of metrics within a Fuse analysis
- Metric development
 - Composition of a Fuse metric
 - The metric editor
 - Creating new metrics
- Advanced techniques
 - Scorecards and weighted metrics
 - Advanced data integration
- Exec reporting - dashboards

Project Metrics

- Analyze schedule, cost, risk models
 - “What > So What > Now What...”
- Objective of **pinpointing** issues, shortcomings and failed tripwires
 - Comparison against benchmarks/thresholds/baselines
- Trending over time
 - Comparisons, performance improvements
- Advanced metrics
 - Beyond standard ‘schedule check’ e.g. logic density
- Fuse Metric Library
 - Over 200 metrics, Metric editor, DCMA 14 Point, GAO, EV etc

Open Ends	Logic Density	Critical	Soft Constraints	Hard Constraints	High Float	Negative Float	High Duration	# of Lags	Max Lag
9 (18%)	2.27	25 (46%)	3 (6%)	4 (8%)	24 (49%)	3 (6%)	8 (16%)	28 (57%)	40

Applying Metrics to a Project

- Fuse metrics can be applied in three dimensions:
 - Ribbons
 - Phases
 - Intersections

Ribbons / Phases	Time Line				Ribbon Analyzer						
	2010	2011	2012	2013	Open Ends	Critical	Soft Constraints	Hard Constraints	High Float	Negative Float	Max Lag
ACom	0 (0%)	0 (0%)	0	0	2 (33%)	0 (0%)	1 (17%)	0 (0%)	0 (0%)	1 (100%)	5
BCom	0 (0%)	1 (100%)	9 (75%)	0	2 (9%)	10 (50%)	1 (4%)	2 (9%)	6 (30%)	4 (20%)	40
CCom	0	5 (50%)	0	0	1 (10%)	5 (50%)	1 (10%)	0 (0%)	5 (50%)	0 (0%)	10
Inhouse	0 (0%)	4 (50%)	2 (100%)	1 (100%)	6 (35%)	7 (70%)	0 (0%)	2 (12%)	2 (20%)	1 (10%)	30
Open Ends	7 (33%)	2 (8%)	1 (7%)	1 (100%)							
Logic Density	2.14	2.27	2.29	1.00							
Critical	0 (0%)	10 (38%)	11 (79%)	1 (100%)							
Soft Constraints	1 (5%)	2 (10%)	0 (0%)	0 (0%)							
Hard Constraints	2 (10%)	2 (10%)	0 (0%)	0 (0%)							
High Float	0	10 (38%)	3 (21%)	0 (0%)							
Negative Float	0	6 (23%)	0 (0%)	0 (0%)							
High Duration	3 (14%)	4 (15%)	2 (14%)	0 (0%)							
Number of Lags	11 (52%)	15 (75%)	3 (21%)	1 (100%)							

Ribbon Analysis

- Engine Rules
 - Metrics get applied to ALL activities within ribbon
 - The timescale of the view is ignored
 - Projects and snapshots get included in analysis
 - No pro-rating of work, duration, cost

Ribbons / Phases	Time Line				Ribbon Analyzer						
	2010	2011	2012	2013	Open Ends	Critical	Soft Constraints	Hard Constraints	High Float	Negative Float	Max Lag
Contractor	ACom				2 (33%)	0 (0%)	1 (17%)	0 (0%)	0 (0%)	1 (100%)	5
	BCom				2 (9%)	10 (50%)	1 (4%)	2 (9%)	6 (30%)	4 (20%)	40
	CCom				1 (10%)	5 (50%)	1 (10%)	0 (0%)	5 (50%)	0 (0%)	10
	Inhouse				6 (35%)	7 (70%)	0 (0%)	2 (12%)	2 (20%)	1 (10%)	30

Phase Analysis

- Engine Rules

- Only projects (not snapshots get included)
- Only those activities that 'touch' the given period get included
- Duration, cost, work gets pro-rated across phases

Ribbons / Phases		Time Line				Ribbon Analyzer	
\$ Total Cost	11/8/2009	11/15/2009	11/22/2009	11/29/2009	Orig. Dur.	\$ Total Cost	
1	\$2,155 (8%)	\$5,657 (22%)	\$2,189 (8%)		10 (40%)	\$10,000 (38%)	
2		\$2,741 (11%)	\$5,234 (20%)	\$2,025 (8%)	10 (40%)	\$10,000 (38%)	
3			\$6,000 (23%)		5 (20%)	\$6,000 (23%)	
Phase Analyzer	Orig. Dur.	2 (9%)	13 (54%)	7 (30%)	2 (8%)		
	\$ Total Cost	\$2,155 (8%)	\$14,398 (55%)	\$7,422 (29%)	\$2,025 (8%)		

Intersection Analysis

- Engine Rules
 - Projects and snapshots get included
 - Only those activities that 'touch' the given intersection period get included
 - Duration, cost, work gets pro-rated across phases

Quick Walkthrough of Metrics

- Metric Library
- Metric Analysis
- Metric Editor

Composition of a Metric

- Primary Formula
- Secondary Formula
- Tripwire Formula
- Tripwire Threshold

Primary Formula

- Primary result from a metric analysis
- Can be a number, percentage, text etc

Name: High Float

Description: Number of activities with total float greater than 2 months. This number should not exceed 5%.

Remarks: Schedule paths with high amounts of float typically arise due to artificially constrained activities or other much longer competing critical paths. Paths with finish float of more than 2 months should be considered for schedule optimization (an opportunity to add additional activities without impacting the project completion date). Includes normal activities and milestones that are planned or in-progress.

Metric Type: ActivityCount

Applies To Ribbons Applies To Phases Applies To Intersections Include in New Workbook

Primary Formula Secondary Formula Tripwire Formula Tripwire Thresholds

Inclusions

Activity Status

Planned
 In Progress
 Complete

Activity Type

Normal
 Milestone
 Summary
 Level of Effort (aka Hammock)

Time Phase

All activities in this Period
 Activities that start in this Period
 Activities that finish in this Period

Filters Add Remove

Field	Op	Field or Value
Total Float	>	44

Secondary Formula

- Percentage relative to primary formula
- Percentage can be relative to the ribbon, the project or the entire workbook population
 - *e.g. # of normal activities relative to the project v # of normal activities relative to the whole workbook*
- Can be text, ratio, other *e.g. other currency*





Tripwire Formula

- Used by the metric engine to return a list of activities for the activity browser
- Can typically be generated automatically

#	ID	Description	Activity Type	Baseline Duration	Original Duration	Remaining Duration	Total Float
1	0110	Project Start	Milestone	0	0	0	0
2	0140	Requirements Definition	Normal	10	10	0	0
3	0170	Bid A review	Normal	22	22	0	0
4	0150	In-House scenario	Normal	15	15	0	0
5	0180	Technical review	Normal	25	25	0	0
6	0190	Commerical review	Normal	20	20	0	0
7	0200	Comms design	Normal	17	17	0	0
8	0240	FEED handover	Normal	25	25	0	25
9	0410	Phase 5	Normal	20	20	0	20
10	0540	Mechanical	Normal	50	50	0	50
11	0100	Project Finish	Milestone	0	0	0	0

Tripwire Thresholds

- Overlay on top of the metric score
- Gives context as to whether a score is acceptable or not...

Name	Color	Value	Description	
Perfect		when value is $< 1E-05$ and \geq	0.0000000	No exceptions.
Very Good		when value is < 0.25 and \geq	0.0000100	Less than 25% exceptions. Some improvements may be req...
Ok		when value is < 0.5 and \geq	0.2500000	Between 25% and 50% exceptions. Some improvements m...
High		when value is \geq	0.5000000	More than 50% exceptions - failed tripwire.

Fuse 2.0 Metric Editor

- Based on three-tier hierarchy of:
 1. Inclusions
 2. Filters
 3. Formulas
- Formulas defined in one of two modes:
 - Basic
 - Use when the metric in question can be defined by a series of composite filters (i.e. Filter A and Filter B and Filter C)
 - Advanced
 - Use when the formula contains complex OR statements and cannot be defined using a series of AND-based filters
- Metrics get applied to **ONLY** the set of activities that have been selected by inclusions and filters

Fuse 2.0 Metric Editor

Name	Critical		
Description	Number of critical activities		
Remarks	The number of critical tasks within a grouping. Typically critical activities have Total Finish Float of zero. Primavera schedules may have critical activities with more than zero float depending on the threshold set in Primavera P6. Includes normal activities and milestones that are planned or in-progress.		
Metric Type	ActivityAttribute	<input checked="" type="checkbox"/> Applies To Ribbons	<input checked="" type="checkbox"/> Applies To Phases
		<input checked="" type="checkbox"/> Applies To Intersections	<input checked="" type="checkbox"/> Include in New Workbook
Primary Formula	<input checked="" type="checkbox"/> Secondary Formula	<input checked="" type="checkbox"/> Tripwire Formula	Tripwire Thresholds
Exclusions			
Activity Status	Activity Type	Time Phase	
<input checked="" type="checkbox"/> Planned	<input checked="" type="checkbox"/> Normal	<input checked="" type="radio"/> All activities in this Period	
<input checked="" type="checkbox"/> In Progress	<input checked="" type="checkbox"/> Milestone	<input type="radio"/> Activities that start in this Period	
<input type="checkbox"/> Complete	<input type="checkbox"/> Summary	<input type="radio"/> Activities that finish in this Period	
	<input type="checkbox"/> Level of Effort (aka Hammock)		
Filters			<input type="button" value="Add"/> <input type="button" value="Remove"/>
Field	Op	Field or Value	
Critical	=	True	
Formula <input checked="" type="radio"/> Basic <input type="radio"/> Advanced			
Formula	Available Fields	Field Values	
	ID		
	Description		
	Activity Type		
	Baseline Duration		
	Original Duration		
	Remaining Duration		
Formula Format: None	<input type="button" value="Check Formula"/>		

Inclusions, Filters, Formulas

Inclusions

- Activity Status e.g. planned, in-progress, complete
- Activity type e.g. normal, milestones, summary
- Time period e.g. starts or finishes in current time period

Filters

- Simple filters based on fields e.g. Actual Start Date > Baseline Start Date
- Multiple filters can be added - treated as AND compounds

Formulas

- User-defined formulas. Useful when needing OR statements, divisions or other advanced functions.

Inclusions

- First level of filter
 - Status
 - Quick means of excluding planned, in-progress, complete
 - Type
 - Quick means of excluding by activity type
 - Time Phase
 - Only applies to phase and intersection metrics
 - Used when needing to avoid double-dipping counts across phases e.g. a missing predecessor activity spanning two phases should only be counted once in the phase within the activity starts

Exclusions

Activity Status

- Planned
- In Progress
- Complete

Activity Type

- Normal
- Milestone
- Summary
- Level of Effort (aka Hammock)

Time Phase

- All activities in this Period
- Activities that start in this Period
- Activities that finish in this Period

Filters

- Second level of filter for the result-set
 - Use to further filter out results based on a series of AND statements
 - Cannot be used for OR filters
 - Most metrics can be completed using exclusions and filters
 - Some metrics still require further formula
 - Advanced metrics can be combination of filter and formula

Filters			Add	Remove
Field	Op	Field or Value		
▶ Number of FS Predecessors	=	0		
Number of SS Predecessors	=	0		
Number of Predecessors	>	0		

Formulas

- Final and optional set of filters
 - Used when a metric cannot simply be defined using exclusions and filters
 - Only applies if set to “advanced”
 - Can be used in conjunction with a ‘filter’ set
 - MUST use if required metric result is anything other than an activity count e.g. average or \$\$

Formula Basic Advanced

Formula: AVERAGE (NumberOfPredecessors +NumberOfSuccessors)

Formula Format: Fixed Point

Available Fields: ID, Description, Activity Type, Baseline Duration, Original Duration, Remaining Duration

Field Values:

Creating Primary Formulas

- Determine if formula is a simple Count type formula that can be defined using a series of exclusions and filters
- If so, then define using inclusions/filters
- If not, then define as much as formula as possible using inclusions and filters and then complete using the formula

Creating Secondary Formulas

- If the secondary formula is simply a percentage of the primary formula (e.g. open ends relative to all activities), then use the “Percentage of Primary Formula” option

Open Ends	Logic Density	Critical	Soft Constraints	Hard Constraints	High Float	Negative Float	High Duration	Number of Lags	Max Lag	Score
11 (20%)	2.21	22 (54%)	3 (5%)	4 (7%)	13 (32%)	6 (15%)	7 (13%)	30 (54%)	40	21%

Creating Tripwire Formulas

- Tripwire formulas return lists of activities (from primary)
- e.g. open ends (primary) = 11
- Tripwire formula returns list of activities

#	ID	Description	Activity Type	Baseline Duration	Original Duration	Remaining Duration	Total Float
1	0110	Project Start	Milestone	0	0	0	0
2	0140	Requirements Definition	Normal	10	10	0	0
3	0170	Bid A review	Normal	22	22	0	0
4	0150	In-House scenario	Normal	15	15	0	0
5	0180	Technical review	Normal	25	25	0	0
6	0190	Commerical review	Normal	20	20	0	0
7	0200	Comms design	Normal	17	17	0	0
8	0240	FEED handover	Normal	25	25	25	25
9	0410	Phase 5	Normal	20	20	20	20
10	0540	Mechanical	Normal	50	50	50	50
11	0100	Project Finish	Milestone	0	0	0	0

Metric Creation Walkthrough

1. Negative Float activities (count)
2. Critical Remaining Duration (duration)
3. Cost overrun (currency)

Conclusions

- Metrics are powerful of analyzing
 - Cost, schedule, EV, risk, performance
 - Not limited to schedule data...
- Fuse provides 100's of standard metrics
- Custom metrics can quickly be created
- Use thresholds to give meaning to scores
- Weight metrics to provide scorecards



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