



Tender Assessment Solution

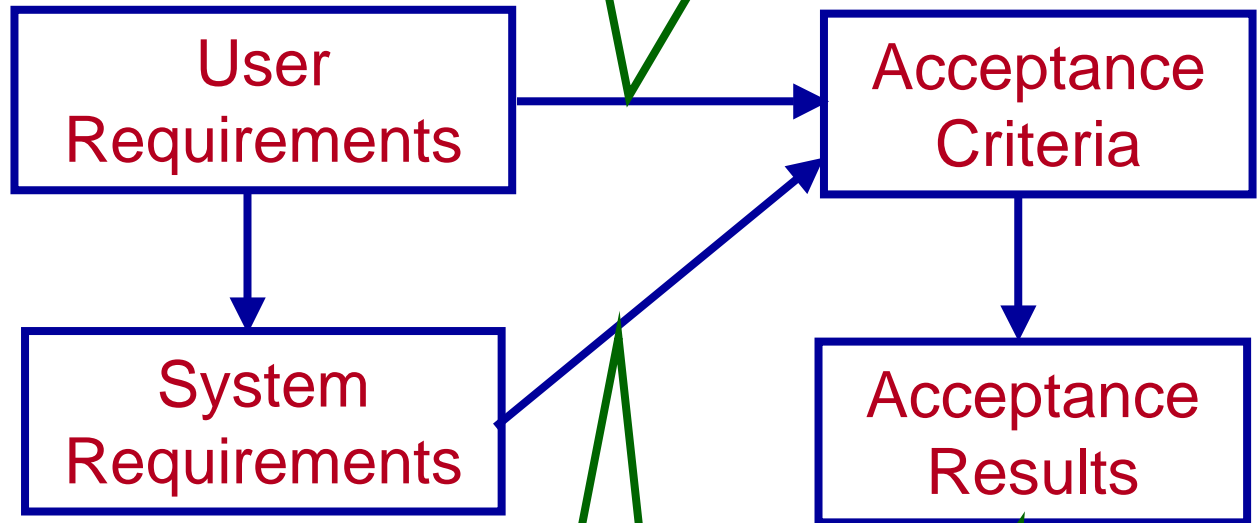
Ken Jackson



Presentation Structure

- ➔ ● **Tender Assessment versus Systems Engineering**
- QSS solution and experience to date
- Process, concepts and organisation
- Implementation of Tender Assessment tool

Systems Engineering *Acceptance into service* ation

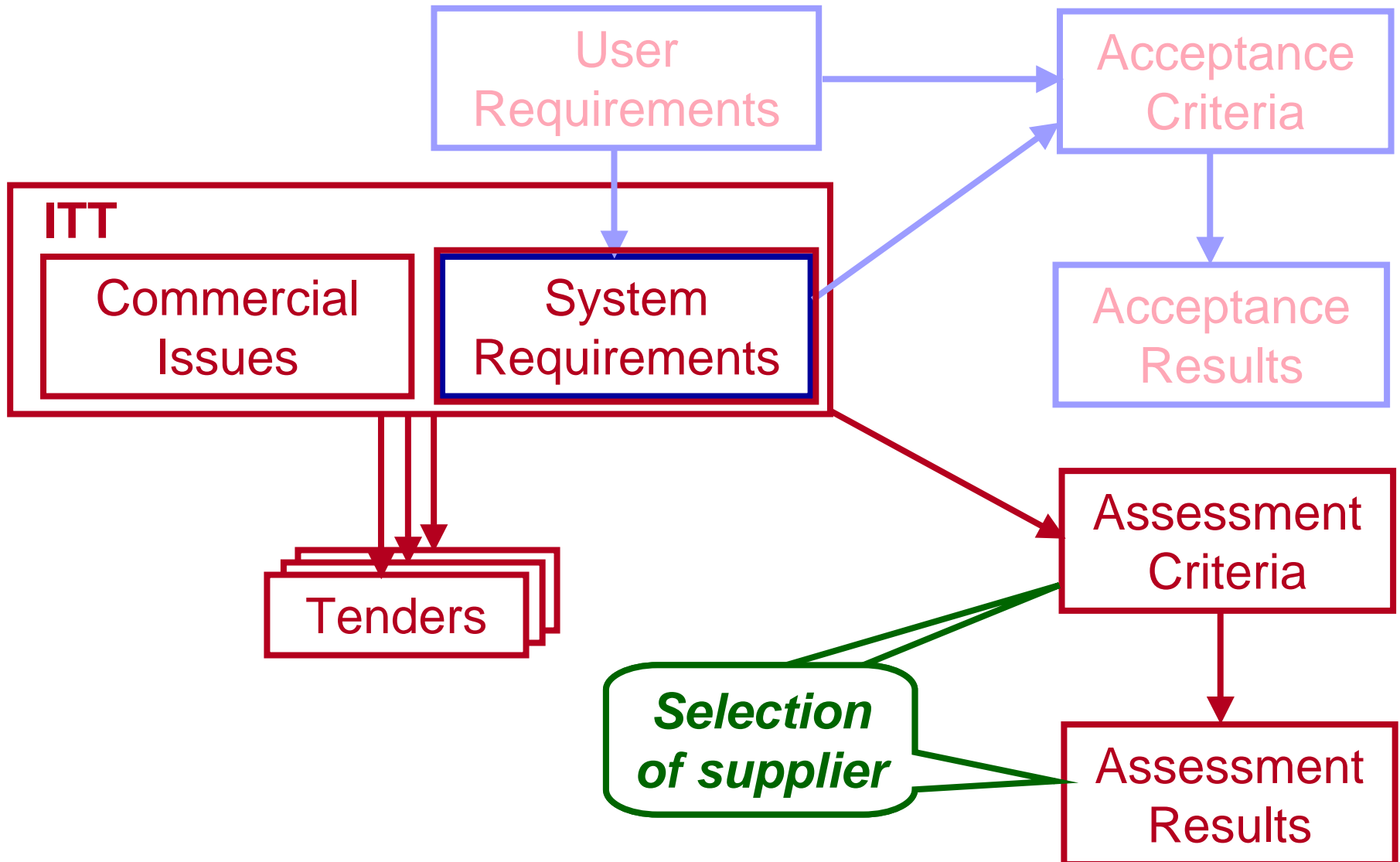


Acceptance into service

Acceptance off contract

From installed equipment

Tender Assessment Information





Tender Assessment problems



Global Problems

- Haphazard unrepeatable process
- Inconsistent results
- Subjective decisions
- No training for individuals
- No corporate learning or maturity
- Not auditable



Presentation Structure

- Tender Assessment versus Systems Engineering
- ➔ ● **QSS solution and experience to date**
- Process, concepts and organisation
- Implementation of Tender Assessment tool



QSS Solution

- Configurable process definition
- Tool support
- Process training
- Tool skills training
- (Templates)
- (Metrics)
- Professional services
- Support services



Built around:

MACE method

MoD Requirements



Features of QSS Solution

- Well defined process (UML notations)
- Process applied in repeatable, consistent manner
- Efficient objective selection
- Decision supported by retained information
- Acquisition information integrated with other information in DOORS
- DOORS provides vehicle for issuing ITT and returning Tender



Experience to date

- **Pilot projects in MoD:**

- Used for AWE project
 - Large project £2.2B
 - Team of 26 people
- Currently in use on several projects including:
 - Army ILS
 - Satellite Communications
 - Submarine escape vehicle

- **Other projects:**

- Canadian ATC Communications
- Canadian Forces Medical Group



Presentation Structure

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- QSS solution and experience to date
- ● **Process concepts and organisation**
- Implementation of Tender Assessment tool

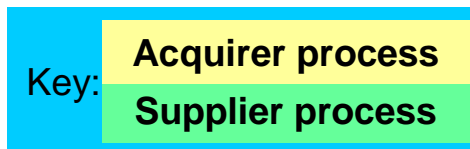
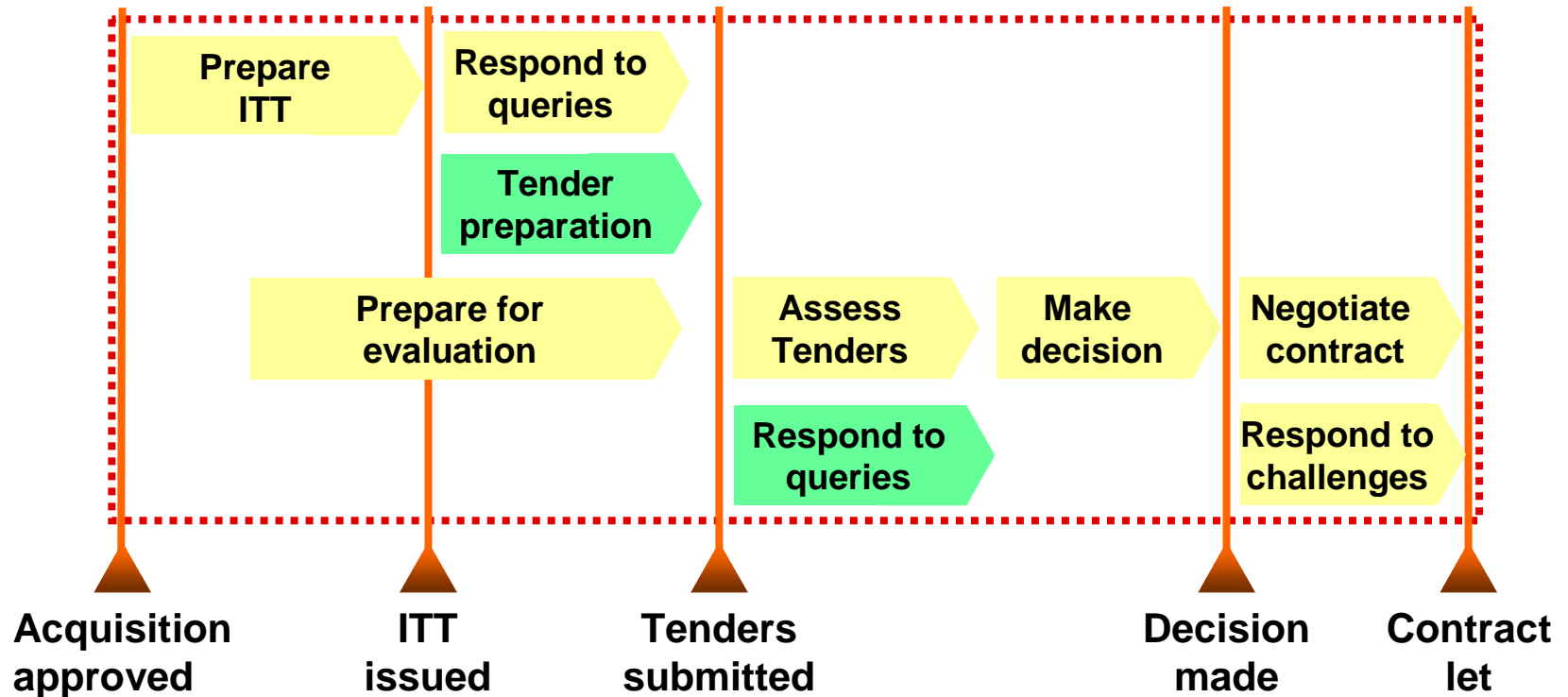
Tender Assessment

ITT



Tenders

Tender Assessment - the process



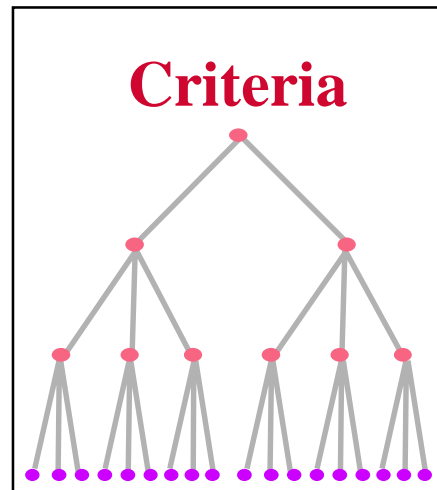
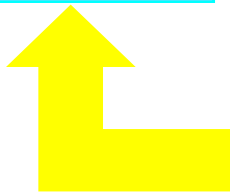


Tender Assessment - Concepts

- How can we discriminate between the Tenders?
 - **Criteria**
- How can each criterion be measured?
 - **Measurement Scales**
- How can we get an overall result?
 - **Aggregation**
 - **Normalisation functions**
- Are all criteria of equal importance
 - **Weights**
- Are there any show stoppers?
 - **Criticality**

Concepts : Criteria

**ITT
(RFP)**



**Tenders
(Proposals)**

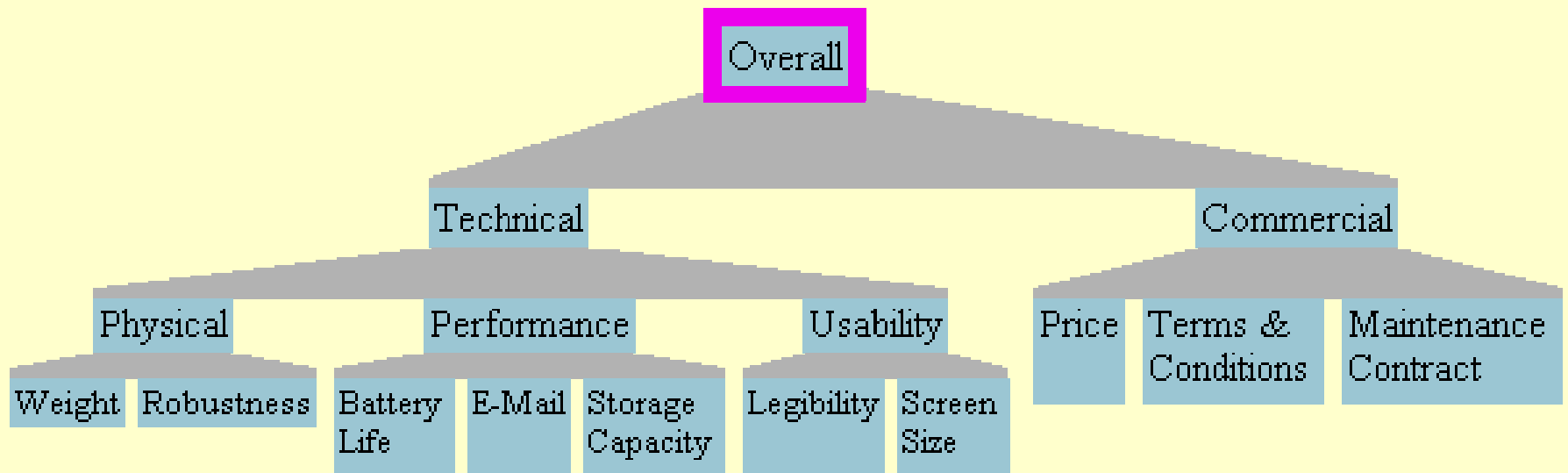




Concepts : Criteria

- What is the overall task?
 - **Select the best Tender**
- What do we mean by “the best”?
 - **Technically sound**
 - **Capable contractor**
 - **Acceptable price**
- What do we mean by capable contractor?
 - **Experienced**
 - **Good track record**
 - **Good and stable staff**
 - **Stable and Reliable**
- and so on.....

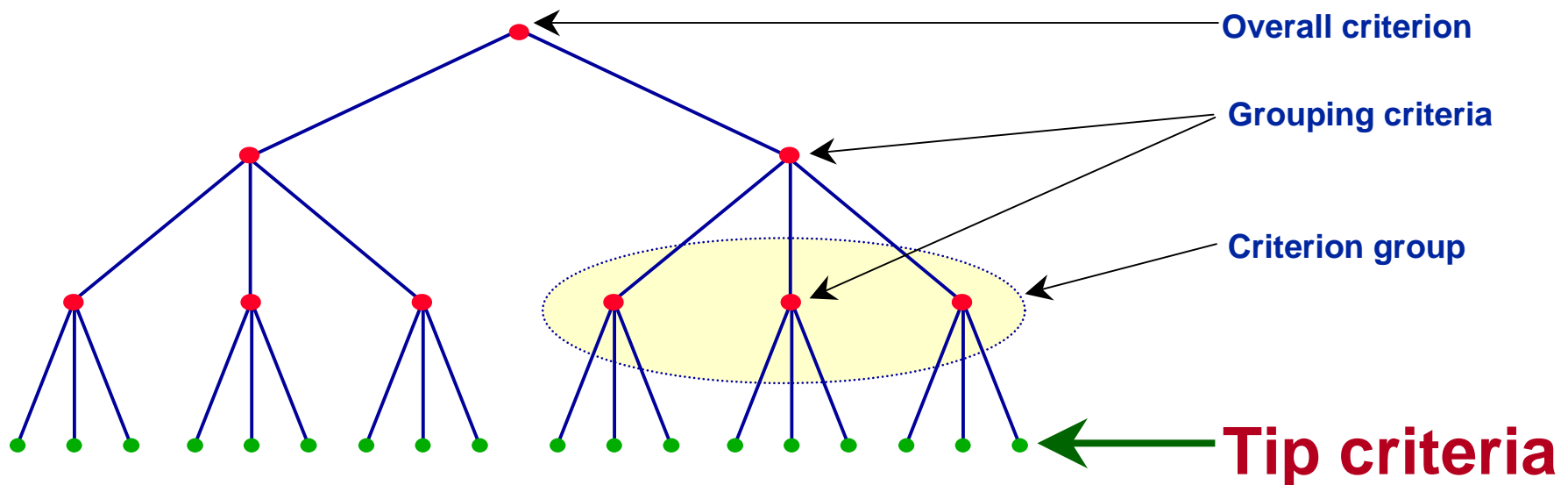
Concepts : Criteria



- Criteria are chosen to discriminate between competing tenders
- The hierarchical structure divides the criteria into groups

Concepts : Criteria

- The tender assessment criteria form a hierarchy
- Each tender is assessed against all **tip criteria**
- Each **tip criterion** has a measurement scale and a normalisation function



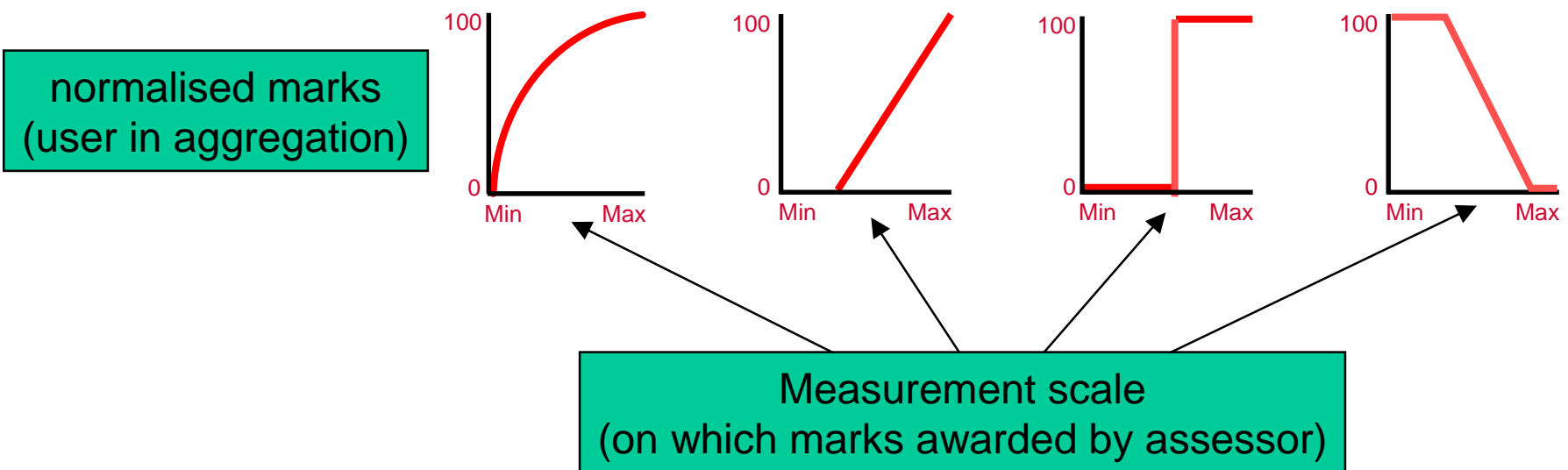


Concepts: Measurement scales

- A tender is assessed against a criterion by awarding marks on a measurement scale
- Scales can be ...
 - numeric e.g. 0.0 to 10.0 in steps of 0.1
 - symbolic e.g. Bad, Poor, Average, Good, Excellent
- Scales should cover all **probable** rather than all **acceptable** values
- Each criterion is measured by exactly one scale
- Need only a few scales to cover many criteria

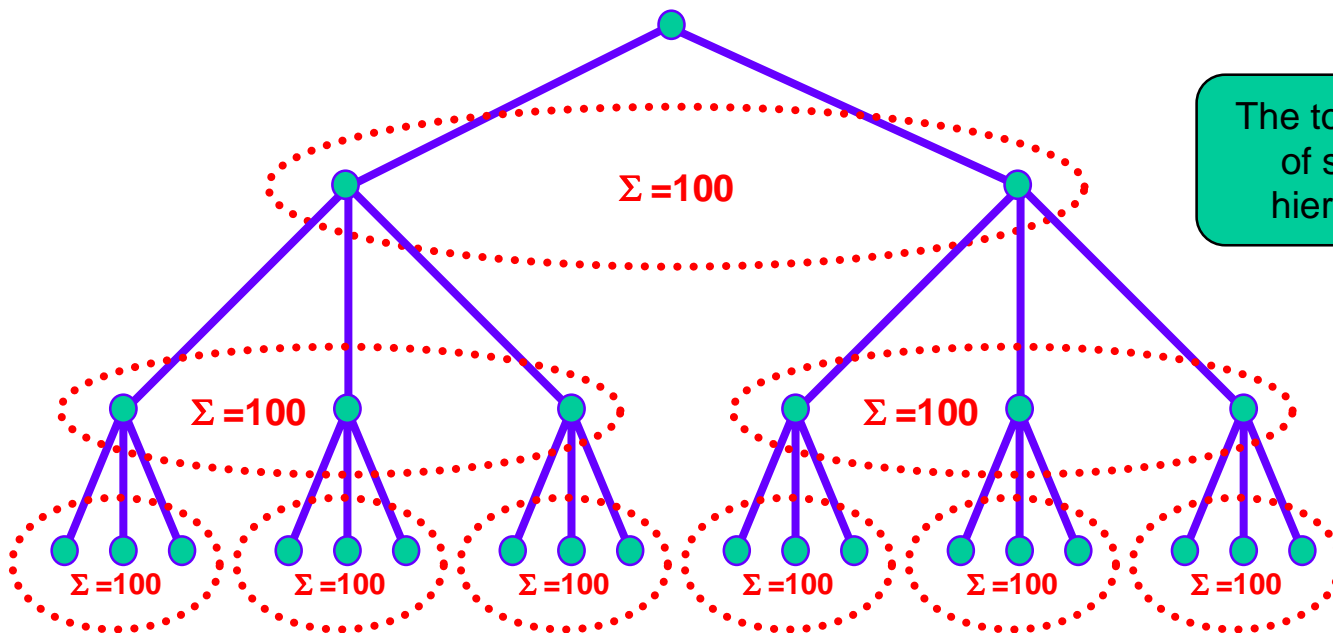
Concepts: normalisation functions

- A normalisation function converts the mark awarded into a normalised mark between 0 and 100



Concepts: Weights

- Each criterion is given a weighting which reflects its relative importance to the overall decision
- Each criterion is weighted on a scale of 0-100



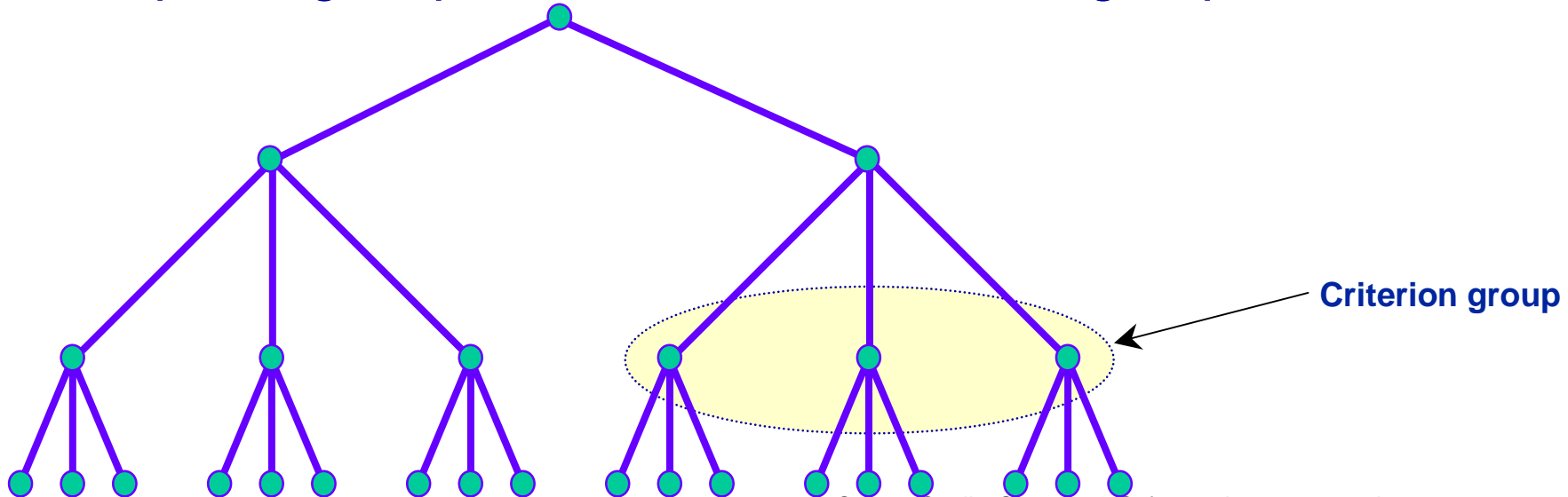
The total weight of each group of siblings in the criterion hierarchy must add to 100

Concepts: Aggregation

- Aggregation is performed by:

Calculated by the tool

- applying normalisation function to the marks awarded by the assessors for each tip criterion
- multiplying the normalised value by the tip's weight/100
- adding the normalised scores for each criterion group
- repeating steps 2 and 3 for all criterion groups





Features of "marking scheme"

- Each criterion has relevant scale
- All scores can be automatically converted to normalised value in range 0-100
- Contributions from each leaf criterion aggregated to give overall result
- All criteria have weight to indicate relative importance
- Weights automatically influence aggregation



Organisation: Roles

- **Preparers**

- Responsible for creating Marking Scheme

- **Specialist Assessment Teams**

- Assigned to set of leaf criteria
- Team members make own assessments
- Team Leader enters Consensus
- Can raise Requests For Clarification (RFCs)

- **Manager and Assistants**

- **Manager and Assistants**

- Track Tender Status
- Nominate Assistants
- Nominate Preparers
- Nominate Assessors
- Construct Teams
- Appoint Team Leaders
- Create Scorecards
- Manage RFCs
- Analyse Results

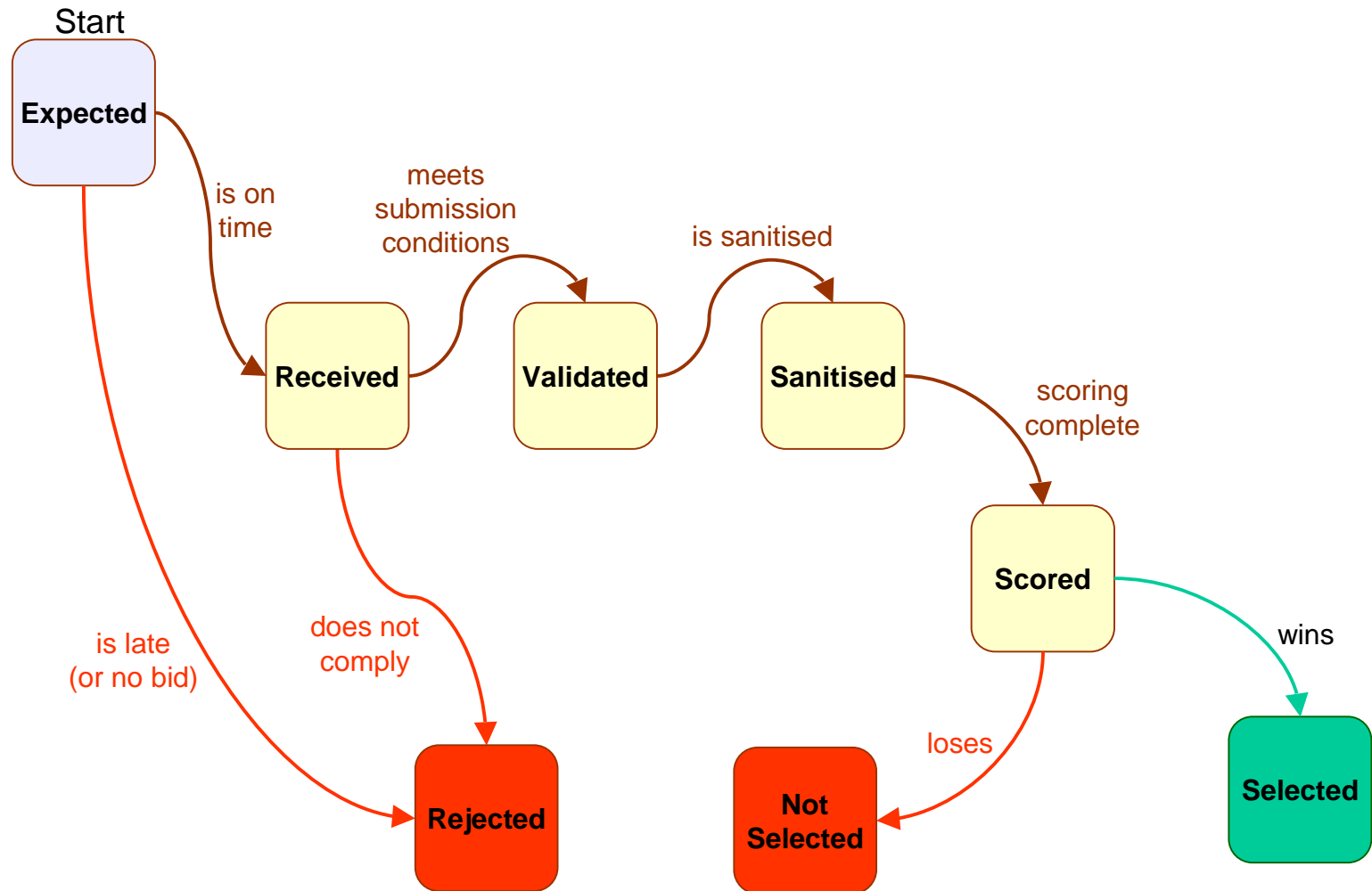
Tender states and Importing Bids

Scoring

RFCs

Analysis

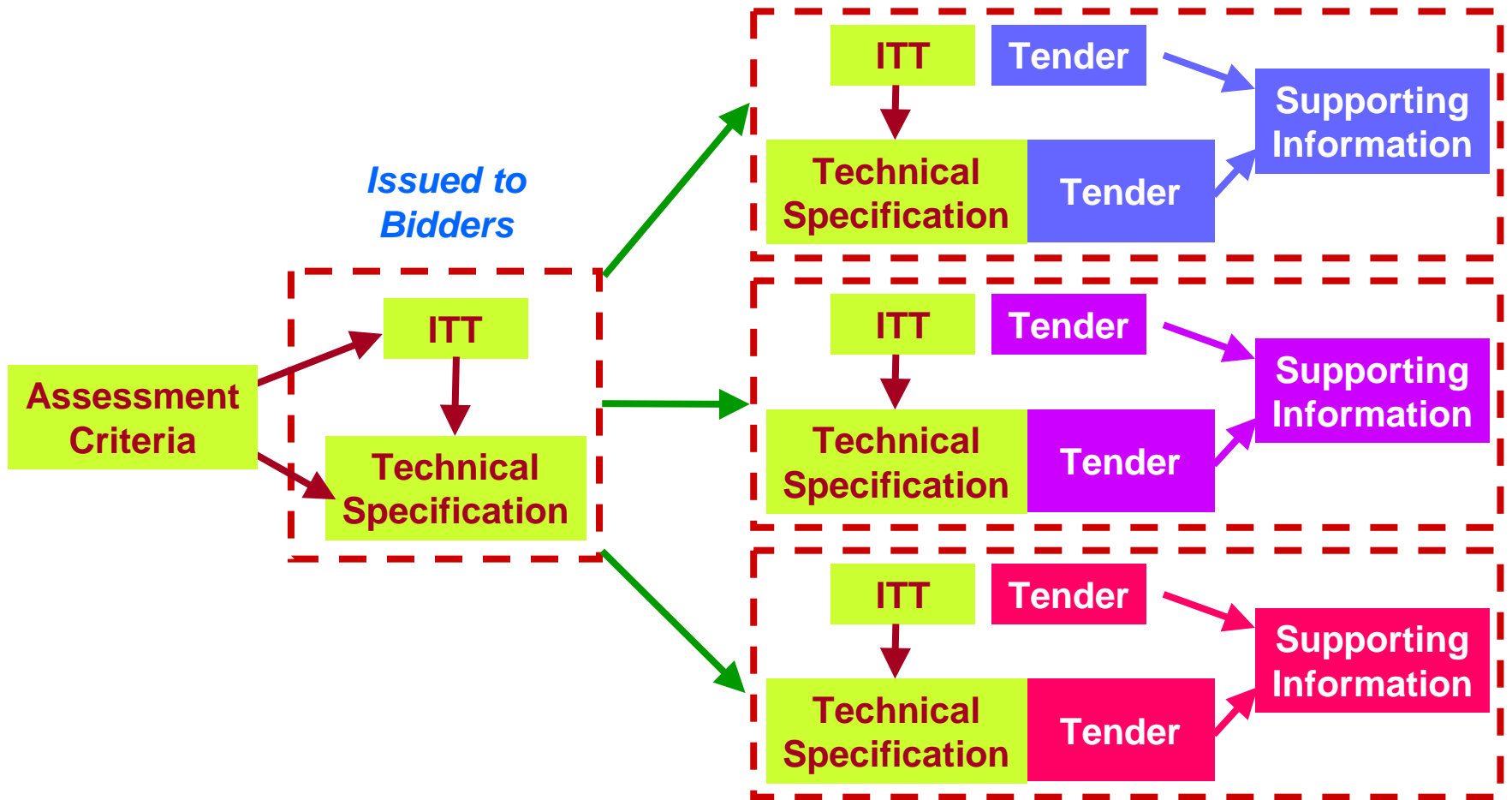
Tender (Bid) Status



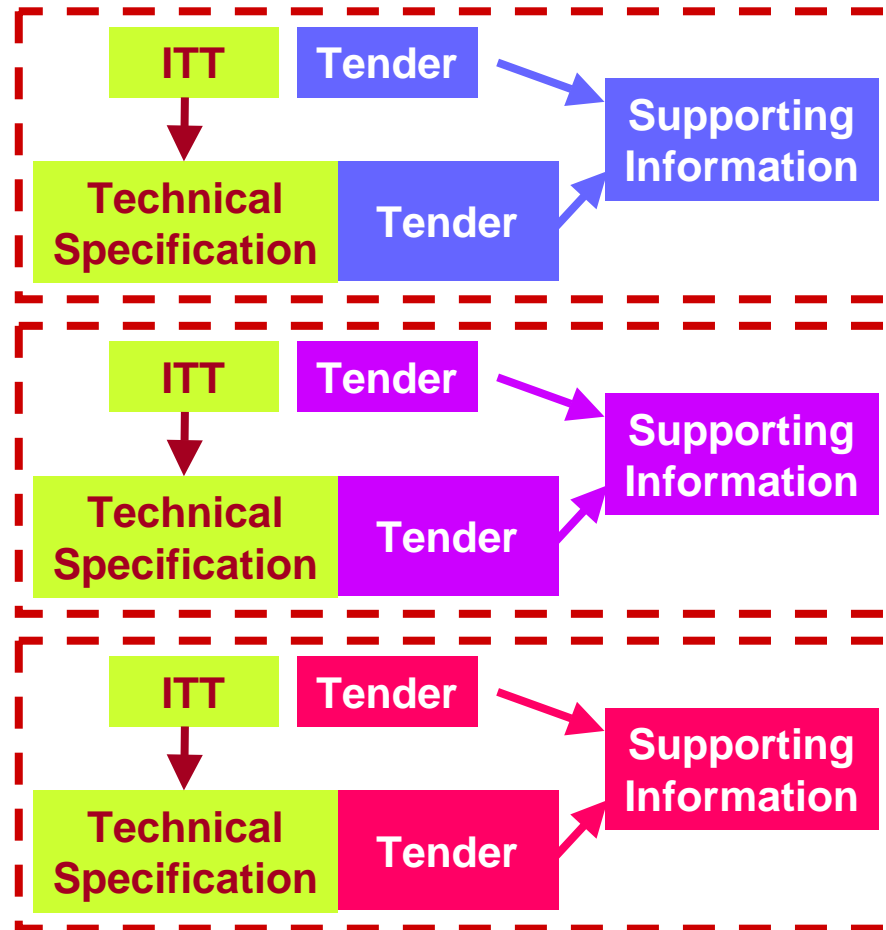
ITT Issue and Tender preparation



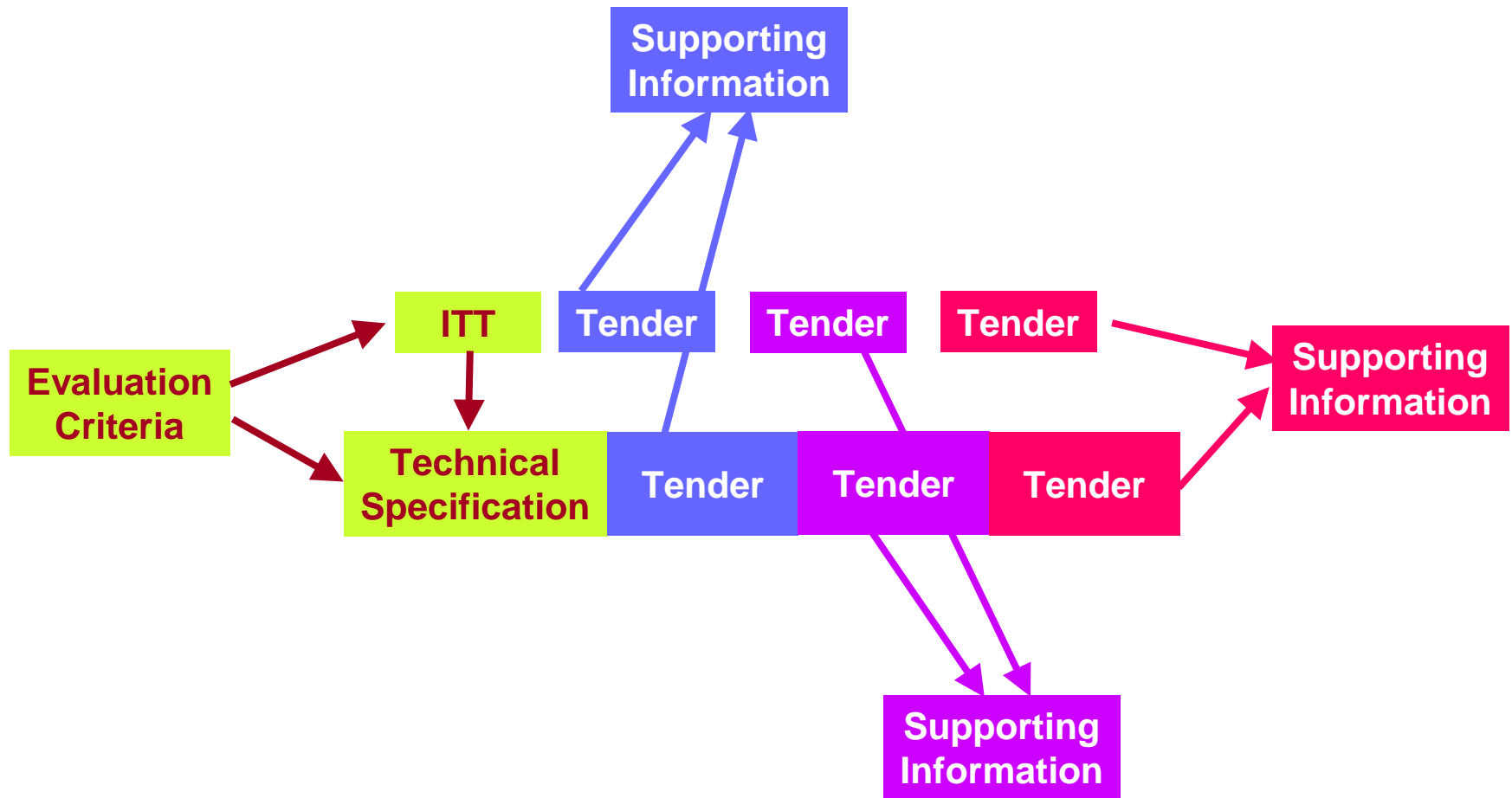
Suppliers build Tenders



Tenders submitted



Importing tenders





Scoring

- Score card concept
- Scoring
 - Individual
 - Consensus
- Viewing progress
 - Individual
 - Team
 - Overall

Score cards

- Score cards required for:

- each team member
- each team leader
- each tender
- each criterion allocated

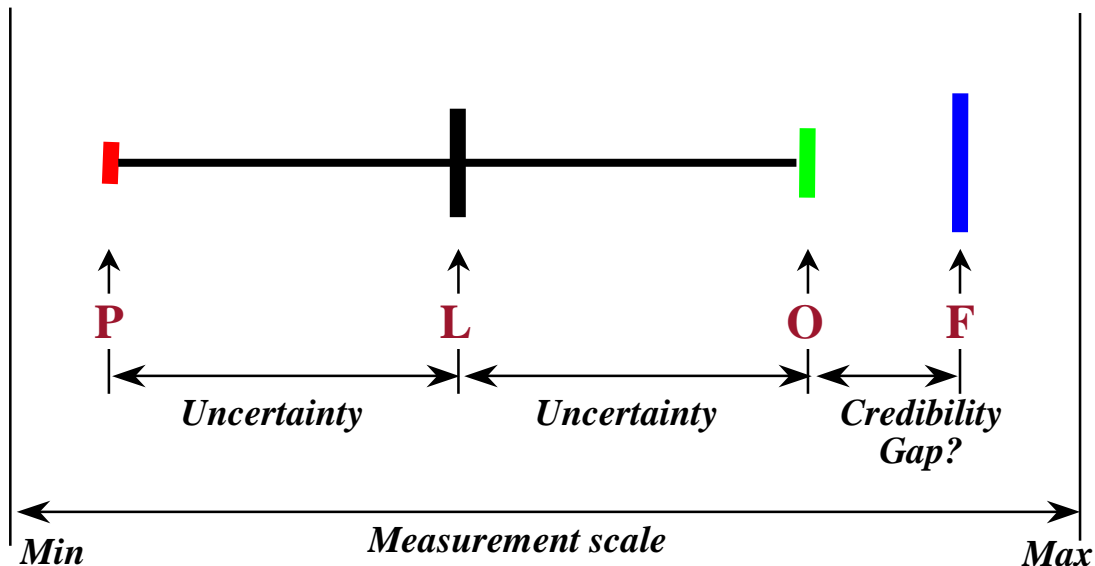
<i>Scores for Assessor A</i>			
	<i>Tender A</i>	<i>Tender B</i>	<i>Tender C</i>
<i>Criterion 1</i>			
<i>Criterion 2</i>			
<i>Criterion 3</i>			
<i>Criterion 4</i>			
<i>Criterion 5</i>			

Awarding Marks

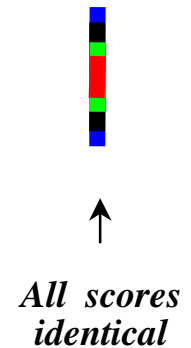
● Marking information requested:

- “Face Value” F
- Optimistic O
- Likely L
- Pessimistic P

● Presentation of marks:



or





Scoring - 1

- Team members supply:
 - FOLP marks
 - Verdict (Pass/Fail)
 - Rationale
- Rationale can be preset to prompt assessors
- Team members can:
 - supply one or more of the FOLP marks
 - if one supplied - rest initially set to same value



Scoring - 2

- Team leaders also supply consensus in terms of:
 - FOLP marks
 - Verdict (Pass/Fail)
 - Rationale
- In addition Team Leaders can:
 - see all team members' scores
 - see Mean Value for scores
 - set Consensus to mean
 - set different Consensus score



Scoring - Progress

- Team members can see:
 - what has been done
 - what is still to do
- Team leaders can see:
 - team members' scores
 - who's work is still outstanding
- Manager has overall view



Benefits of scoring and progress

- Score cards automatically tailored to teams
- Measurement scale automatically selected
- Rationale can be preset to assist assessors
- Team members can see:
 - what has been done
 - what is still to do
- Team leaders can see:
 - team members' scores
 - who's work is still outstanding
- Manager has overall view



Managing RFCs

- Raised by assessors
- Progressed by Assessment Manager
 - validate / approve
 - send out to bidder
 - receive response
 - import response
- Response acted on by assessors
- Scoring inhibited whilst RFC response awaited
- Status view drives manager / assistant(s)
- Easy to see where progress is held up



Analysis Facilities

- Aggregation
- Margin
- ***Sensitivity Analysis***
- Team Consensus
- View Scores



Analysis views

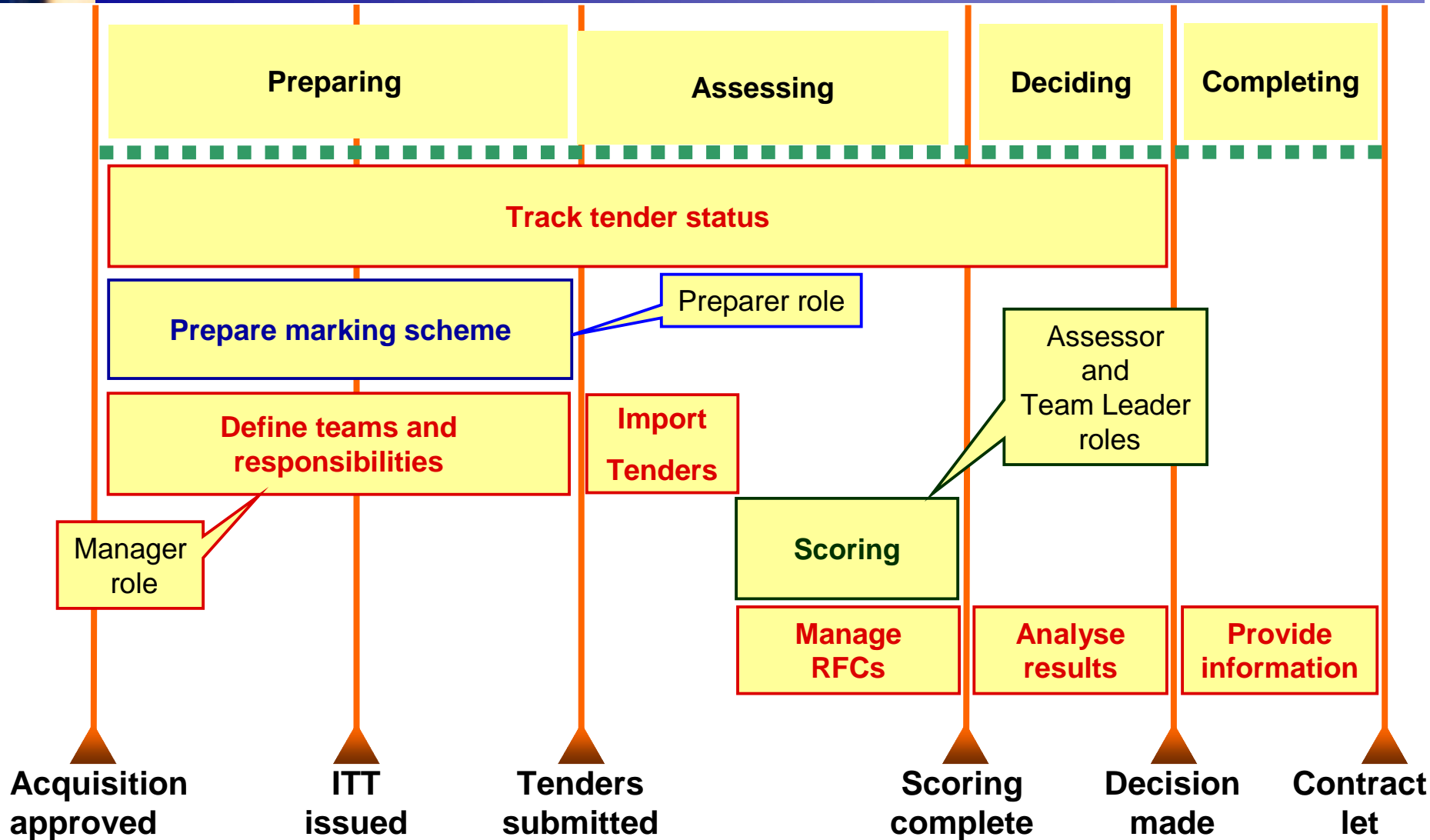
- Can determine whether winner:
 - comes top on each criterion
 - is never top on any criterion
 - comes top on important criteria
- Can detect extent of
 - team consensus for each team
 - uncertainty of evaluators
- Provides useful information for:
 - debriefing bidders
 - supporting purchase case
 - contract negotiation



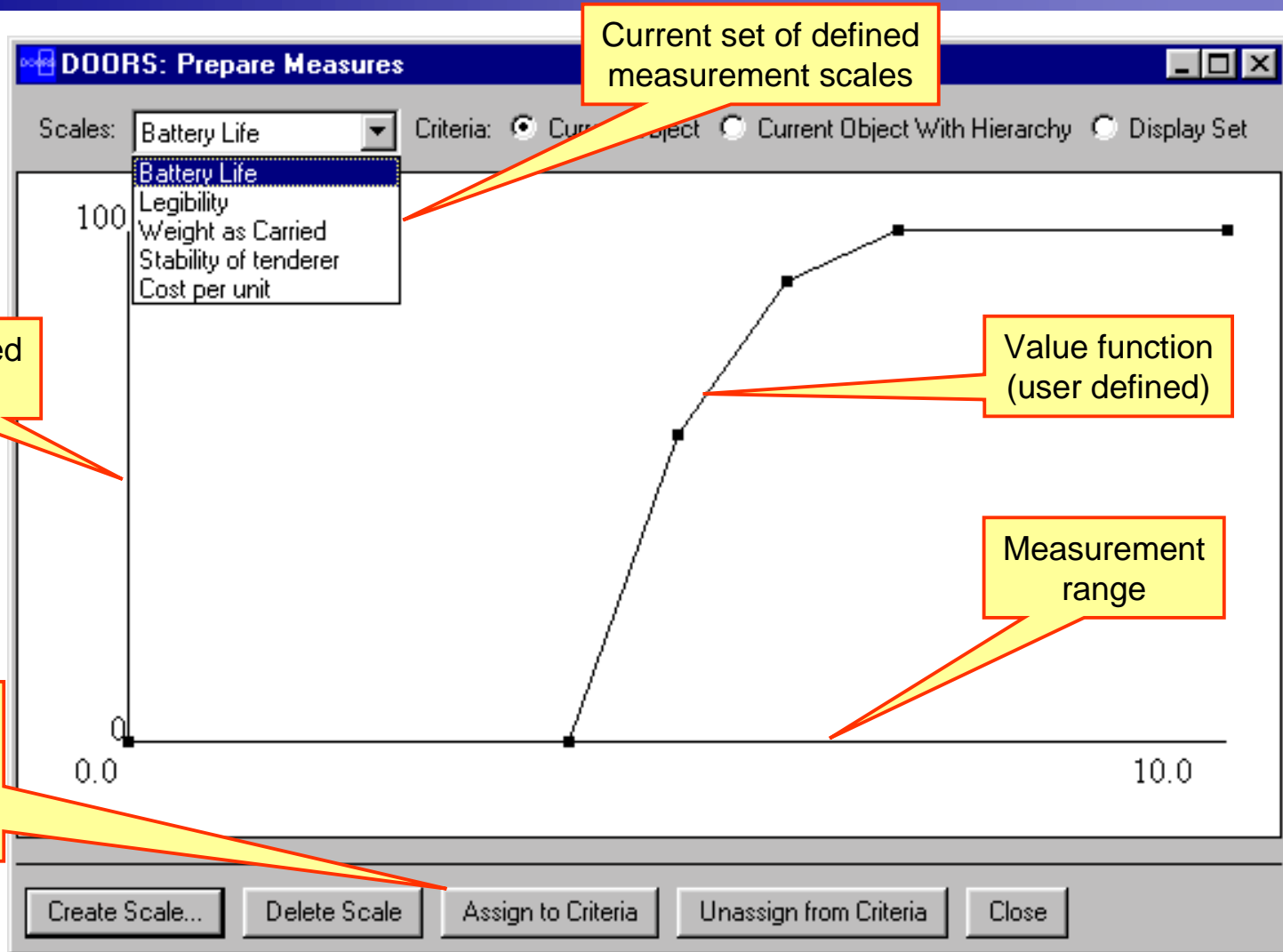
Presentation Structure

- Tender Assessment in Smart Procurement
- QSS solution
- Process and concepts
-  ● **Implementation of Tender Assessment tool**

Tool Facilities



Marking Scheme: Measurement Scales



Marking Scheme: Weights

- Assess the Sensitivity of each criterion.
- Does it make sufficient difference to the result?
- Is the overall balance right

Importance of this criterion compared to its siblings

Sensitivity of total score to score awarded on this criterion

ID	TA Criteria	Weight	Sensitivity
CRT-1	1 Overall	100	1000 / 1000
CRT-2	1.1 Technical	50	500 / 1000
CRT-3	1.1.1 Battery Life	40	200 / 1000
CRT-4	1.1.2 Screen Legibility	30	150 / 1000
CRT-5	1.1.3 Weight as Carried	30	150 / 1000
CRT-6	1.2 Commercial	50	500 / 1000
CRT-7	1.2.1 Stability of Bidder	40	200 / 1000
CRT-8	1.2.2 Cost	60	300 / 1000

TA
Criteria

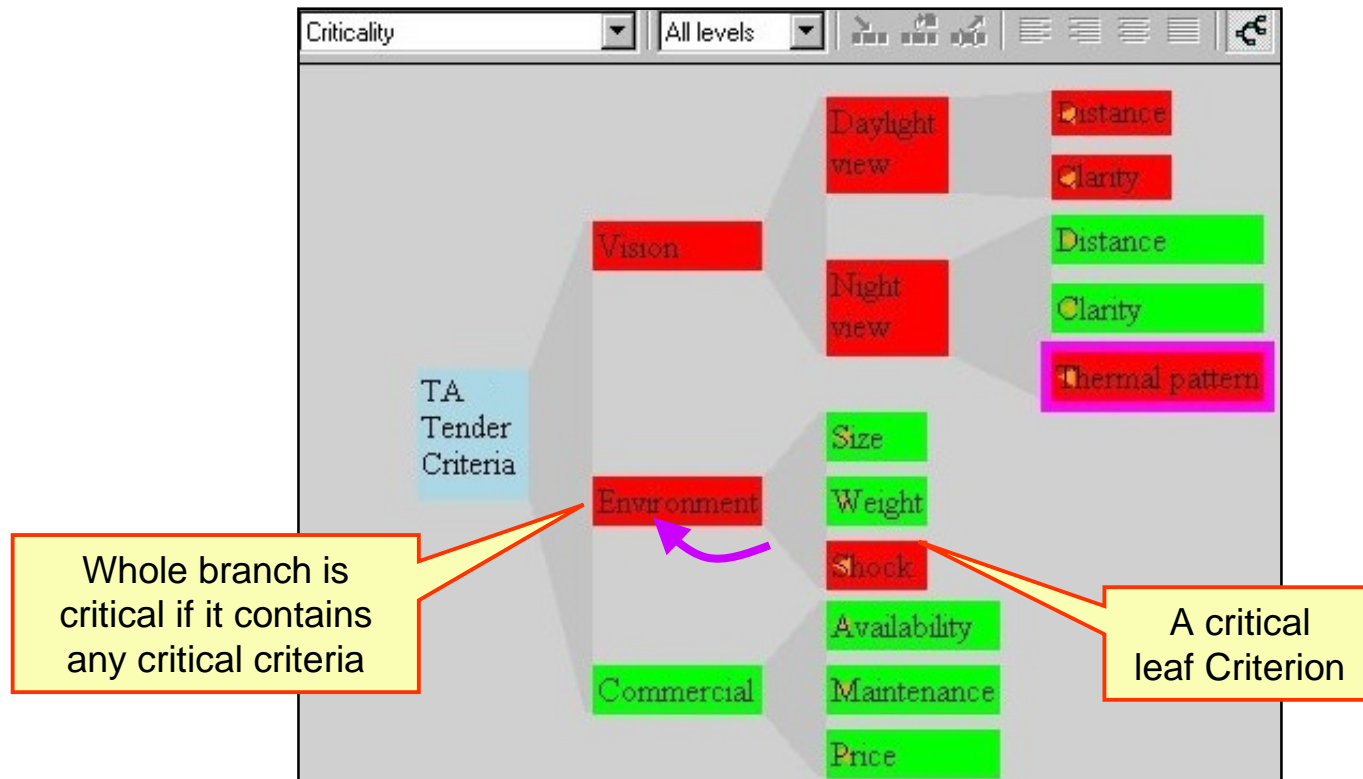
100

40
50
30
30
40
60

Weights can also be viewed in graphic mode

Marking Scheme: Criticality

- Are any leaf criteria show stoppers?
- Critical branches and leaf criteria are shown in red



Manage Teams

DOORS: Manage Teams

Name Teams Name Assessors Build Teams

Teams

Engineering
Finance

Assessors in Team:

Edith (Leader)
Edward
Ernie

←

→

Edith
Edward
Ernie
Felicity
Felix
Frederick

Criteria: Current Object Current Object With Hierarchy Display Set

Set Leader Assign Unassign Close

Individual Card

Horizontal arrows
move between Tenders
(for same Criterion)

Vertical arrows
move between Criteria
(for same Tender)

DOORS: Assess (Technical)

Navigation:

Criteria: Critical Non Critical All

Tender:

Criterion:

Rationale:

Verdict: Undecided Passed Failed

Measurement scale:

Archie

Face Value:

Likely:

Optimistic:

Pessimistic:

Current Criterion

Current Tender

Viewing progress

DOORS: Formal module 'TA Tender Criteria' current 0.0 (ready to score)

Module Edit View Object Attribute Column Link Table Tools User Tender Help

My Scores All levels

Object Identifier	TA Tender Criteria	Acme	Best
CRIT1	1 Overall		
CRIT2	1.1 Technical		
CRIT4	1.1.1 Battery Life		
CRIT5	1.1.2 Screen Legibility		
CRIT6	1.1.3 Weight as Carried		
CRIT3	1.2 Commercial		
CRIT7	1.2.1 Stability of Tenderer		
CRIT8	1.2.2 Cost		

User name: Archie Read Only

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View interpreted for current user

Criterion not assigned to this team

Criteria Read Only when scoring

ring

DOORS: Technical Team Scores

Select team member:

- Alan
- Archie
- Alex

Score for criterion CRIT-4 on tender Acme

Verdict: F: L: O: P:

Rationale:

Strengths:

Risks:

Assessment based on:
[Module/Section/Object]

Other comments:

S: Assess (Technical - Team Leader)

Criteria: Critical Non Critical All

Tender:

[CRIT-4]
1.1.1: Battery Life

Strengths:

Risks:

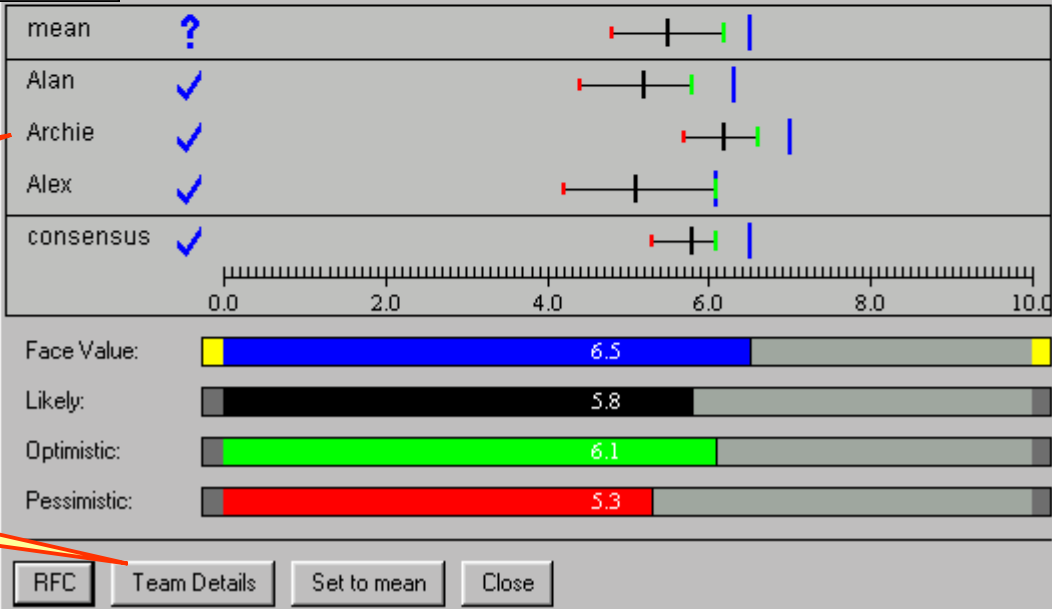
Assessment based on:
[Module/Section/Object]

Undecided Passed Failed

Measurement scale:

Scrollable area for team's scores

Get details of team scores



Overall Progress

DOORS: Formal module 'TA Tender Criteria' current 0.0 (ready to score)

Module Edit View Object Attribute Column Link Table Tools User Tender Help

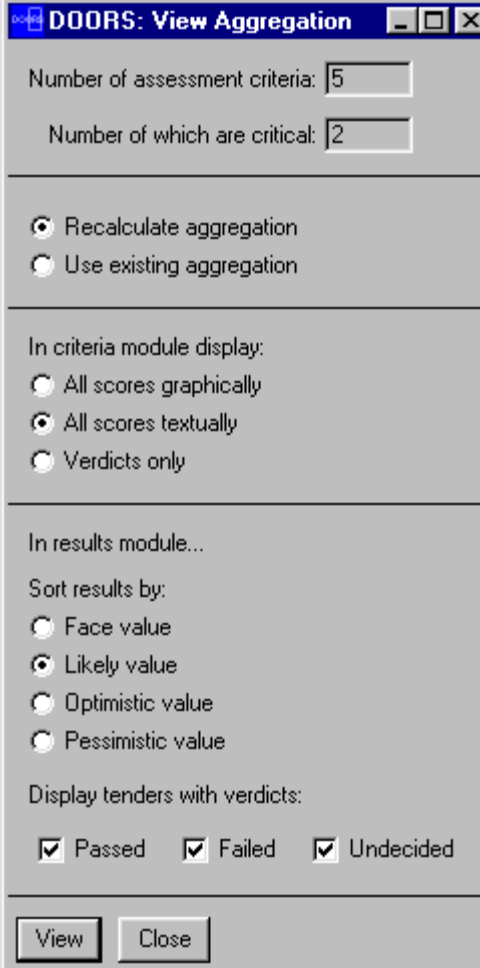
Progress View All levels

Object Identifier	TA Tender Criteria	Team	Acme - (Missing scores in bold)	Best - (Missing scores in bold)
CRIT1	1 Overall	---	---	---
CRIT2	1.1 Technical	---	---	---
CRIT4	1.1.1 Battery Life	Technical	Alan Anna [Manager] [RFC pending] Archie Alex	Alex Archie Anna [Manager]
CRIT5	1.1.2 Screen Legibility	Technical	Alan Anna [Manager] Archie Alex	Alex Archie Anna [Manager] Alan
CRIT6	1.1.3 Weight as Carried	Technical	Alan Anna [Manager] Archie Alex	Alex Archie Anna [Manager] Alan
CRIT3	1.2 Commercial	---	---	---
CRIT7	1.2.1 Stability of Tenderer	Commercial	Adam [Manager] Anders	Anders Adam [Manager]
CRIT8	1.2.2 Cost	Commercial	Adam [Manager] Anders	Anders Adam [Manager]

User name: Ian Alexander

Analysis Facilities - Aggregation

- Aggregates Consensus scores
- Can re-use previous aggregation
- Provides viewing options
 - in Criteria module
 - in Results module



The screenshot shows a dialog box titled "DOORS: View Aggregation". It contains several input fields and radio button options. The "Number of assessment criteria" field is set to 5, and the "Number of which are critical" field is set to 2. There are two radio button options: "Recalculate aggregation" (selected) and "Use existing aggregation". Under "In criteria module display:", there are three radio button options: "All scores graphically", "All scores textually" (selected), and "Verdicts only". Under "In results module...", there are four radio button options for "Sort results by": "Face value", "Likely value" (selected), "Optimistic value", and "Pessimistic value". At the bottom, there are three checked checkboxes for "Display tenders with verdicts": "Passed", "Failed", and "Undecided". The dialog box has "View" and "Close" buttons at the bottom.

Aggregation Numerical Views

Bid 4 comes first in terms of L Value

DOORS: Formal module 'TA Result' current 0.0

Module Edit View Object Attribute Column Link Table Tools User Assessment scenarios Help

Sorters by L Value All levels

Vendor	Verdict	#Criteria for V	F Value	#Criteria for F	L Value	#Criteria for L	O Value	#Criteria for O	P Value	#Criteria for P
Bid 4	Passed	2 (100%)	73	5 (100%)	62	5 (100%)	64	5 (100%)	57	5 (100%)
Bid 1	Passed	2 (100%)	62	5 (100%)	50	5 (100%)	54	5 (100%)	44	5 (100%)
Bid 2	Passed	2 (100%)	81	5 (100%)	50	5 (100%)	69	5 (100%)	42	5 (100%)
Bid 3	Failed	2 (100%)	81	5 (100%)	46	5 (100%)	63	5 (100%)	36	5 (100%)

DOORS: Formal module 'TA Criteria' current 0.0

Module Edit View Object Attribute Column Link Table Tools User Assessment scenarios Help

Aggregated LValues All levels

Criteria	Bid 1 - L	Bid 2 - L	Bid 3 - L	Bid 4 - L
1 Overall	50	50	46	62
1.1 Technical	29	35	28	35
1.1.1 Battery Life	0	0	30	0
1.1.2 Screen Legibility	80	60	40	80
1.1.3 Weight as Carried	18	55	13	38
1.2 Commercial	71	66	65	88
1.2.1 Stability of Bidder	60	60	30	100
1.2.2 Cost	78	70	88	80

Customised view showing only L Values

Aggregating graphical

Overall reasonable

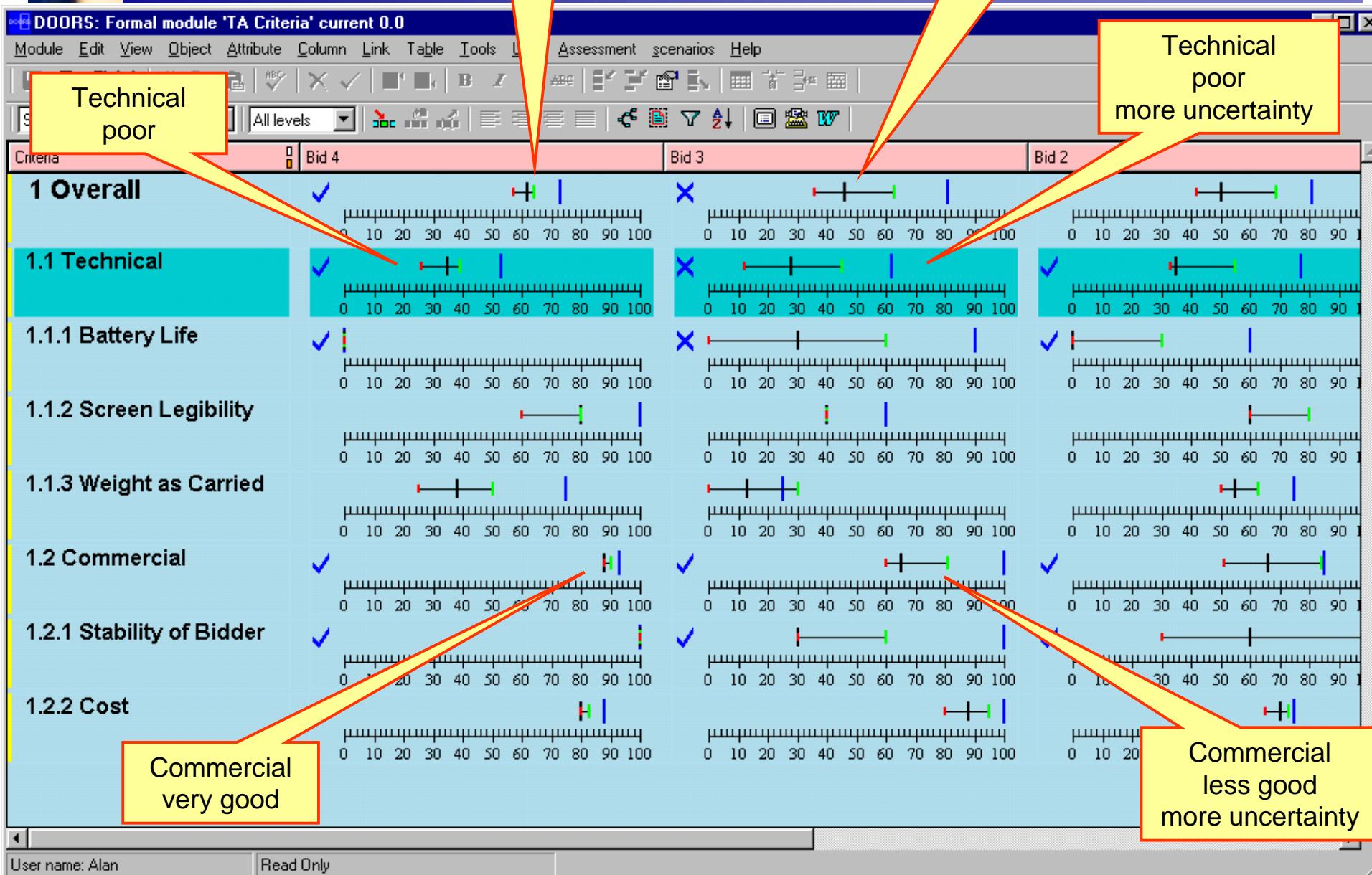
Overall less good more uncertainty

Technical poor

Technical poor more uncertainty

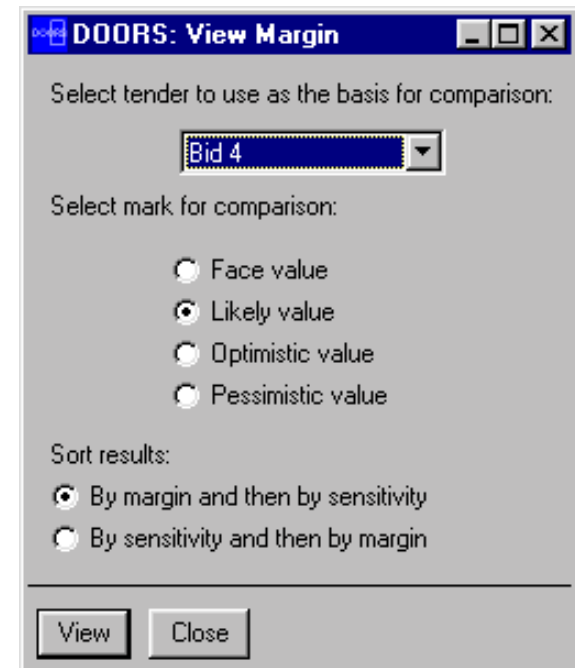
Commercial very good

Commercial less good more uncertainty



Analysis Facilities - Margin

- Compares any bid with the rest
 - indicates margin against best competitor for each criterion
 - positive = selected bid is best
 - negative = selected bid is not best
 - select any of the four scores
 - select a sorting option



Margin views

DOORS: Formal module 'TA Criteria' current 0.0

Module Edit View Object Attribute Column Link Table Tools User Assessment scenarios Help

Standard view All levels

ID	Criteria	Sensitivity	Bid 4 Margin [L]	Best of Rest
CRT-7	1.2.1 Stability of Bidder	200 / 1000	40.000000	Bid 2
CRT-6	1.2 Commercial	500 / 1000	17.500000	Bid 1
CRT-1	1 Overall	1000 / 1000	11.375000	Bid 2
CRT-2	1.1 Technical	500 / 1000	0.750000	Bid 2
CRT-4	1.1.2 Screen Legibility	150 / 1000	0.000000	Bid 1
CRT-8	1.2.2 Cost	300 / 1000	-7.500000	Bid 3
CRT-5	1.1.3 Weight as Carried	150 / 1000	-17.500000	Bid 2
CRT-3	1.1.1 Battery Life	200 / 1000	-30.000000	Bid 3

View sorted by Margin

Margin views

DOORS: Formal module 'TA Criteria' current 0.0

Module Edit View Object Attribute Column Link Table Tools User Assessment scenarios Help

Standard view All levels

View sorted by Margin

ID	Criteria	Sensitivity	Bid 4 Margin [L]	Best of Rest
CRT-7	1.2.1 Stability of Bidder	200 / 1000	40.000000	Bid 2
CRT-6	1.2 Commercial	500 / 1000	17.500000	Bid 1
CRT-1	1 Overall	1000 / 1000	11.375000	Bid 2
CRT-2	1.1 Technical	500 / 1000	0.750000	Bid 2
CRT-4	1.1.2 Screen Legibility	150 / 1000	0.000000	Bid 1
CRT-8	1.2.2 Cost	300 / 1000	-7.500000	Bid 3
CRT-5	1.1.3 Weight as Carried	150 / 1000	-17.500000	Bid 2
CRT-3	1.1.1 Battery Life	200 / 1000	-30.000000	Bid 3

Unsorted view

Standard view All levels

ID	Criteria	Sensitivity	Bid 4 Margin [L]	Best of Rest
CRT-1	1 Overall	1000 / 1000	11.375000	Bid 2
CRT-2	1.1 Technical	500 / 1000	0.750000	Bid 2
CRT-3	1.1.1 Battery Life	200 / 1000	-30.000000	Bid 3
CRT-4	1.1.2 Screen Legibility	150 / 1000	0.000000	Bid 1
CRT-5	1.1.3 Weight as Carried	150 / 1000	-17.500000	Bid 2
CRT-6	1.2 Commercial	500 / 1000	17.500000	Bid 1
CRT-7	1.2.1 Stability of Bidder	200 / 1000	40.000000	Bid 2
CRT-8	1.2.2 Cost	300 / 1000	-7.500000	Bid 3

Margin views

DOORS: Formal module 'TA Criteria' current 0.0

Module Edit View Object Attribute Column Link Table Tools User Assessment scenarios Help

Standard view All levels

View sorted by Margin

DOORS: Formal module 'TA Criteria' current 0.0

Module Edit View Object Attribute Column Link Table Tools User Assessment scenarios Help

Standard view All levels

View sorted by Sensitivity

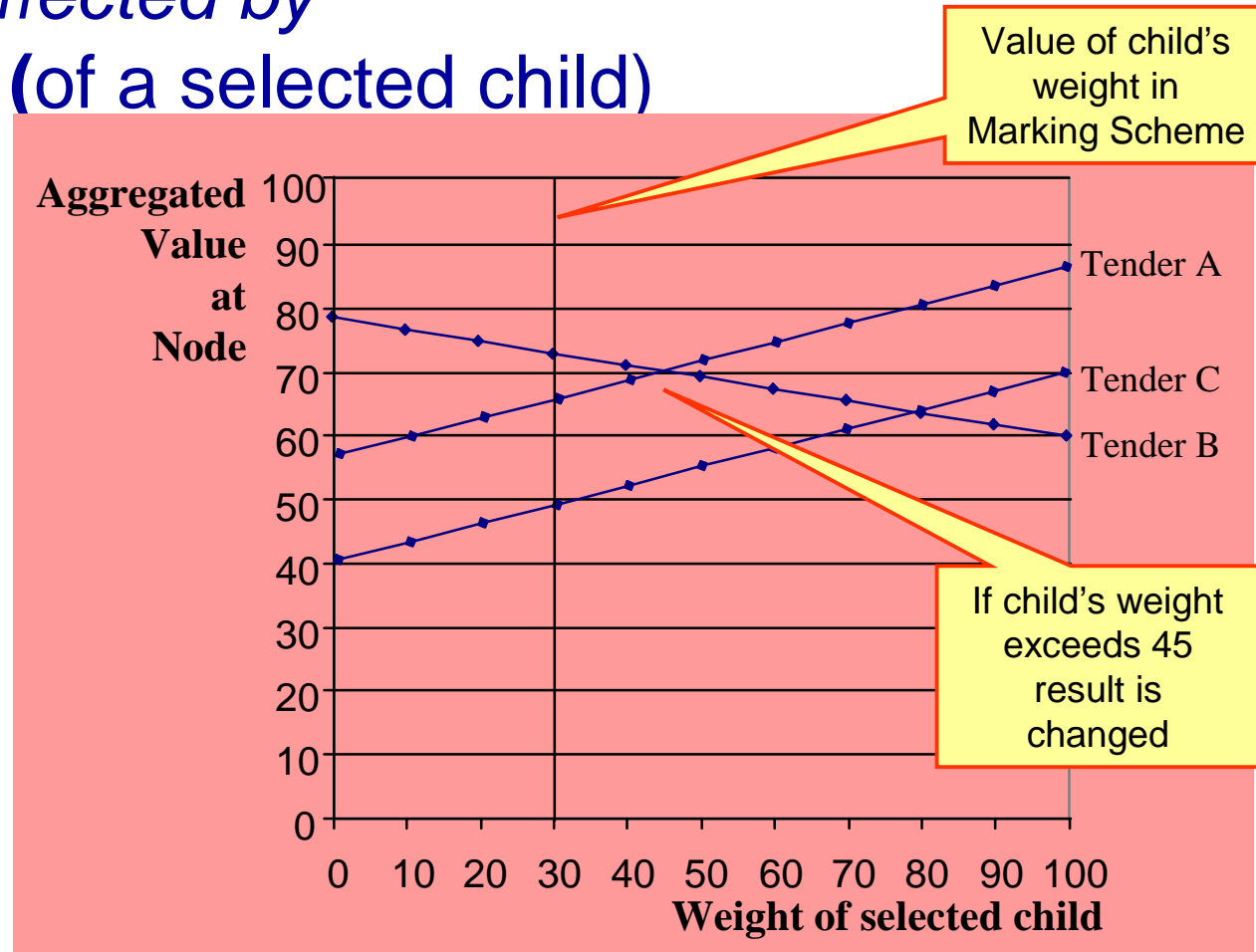
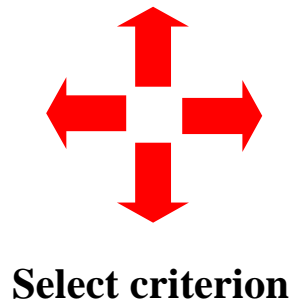
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CRT-1	1 Overall	1000 / 1000	11.375000	Bid 2
CRT-6	1.2 Commercial	500 / 1000	17.500000	Bid 1
CRT-2	1.1 Technical	500 / 1000	0.750000	Bid 2
CRT-8	1.2.2 Cost	300 / 1000	-7.500000	Bid 3
CRT-7	1.2.1 Stability of Bidder	200 / 1000	40.000000	Bid 2
CRT-3	1.1.1 Battery Life	200 / 1000	-30.000000	Bid 3
CRT-4	1.1.2 Screen Legibility	150 / 1000	0.000000	Bid 1
CRT-5	1.1.3 Weight as Carried	150 / 1000	-17.500000	Bid 2

Unsorted view

Margin [L]	Best of Rest
11.375000	Bid 2
0.750000	Bid 2
-30.000000	Bid 3
0.000000	Bid 1
-17.500000	Bid 2
17.500000	Bid 1
40.000000	Bid 2
-7.500000	Bid 3

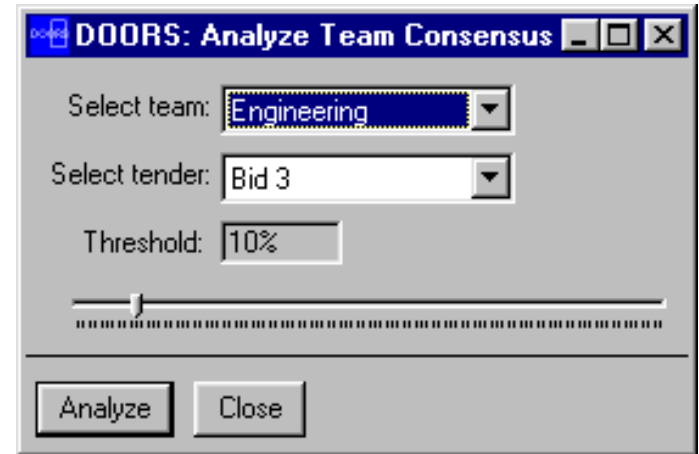
Analysis Facilities - Sensitivity

- Plots a graph for each Tender to indicate how: **aggregated value** (at a selected node) *is affected by* **weight** (of a selected child)



Analysis Facilities - Team Consensus

- Select a team
- Select threshold



Analysis Facilities - Team Consensus

- Select a team
- Select threshold

DOORS: Analyze Team Consensus

Select team:

Select tender:

Threshold:

DOORS: Formal module 'TA Criteria' current 0.0

Module Edit View Object Attribute Column Link Table Tools User Assessment scenarios Help

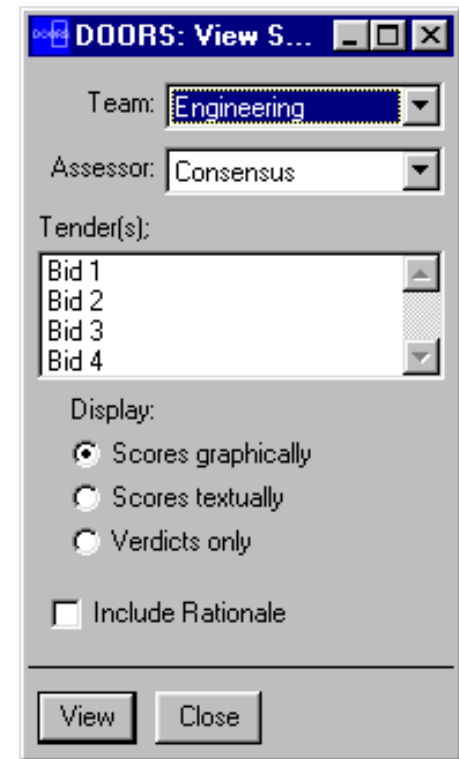
Standard view All levels

ID	Engineering team criteria (10% threshold)	Bid 3 - F	Bid 3 - L	Bid 3 - O	Bid 3 - P
CRT-1	1 Overall	---	---	---	---
CRT-2	1.1 Technical	---	---	---	---
CRT-3	1.1.1 Battery Life	6.000000 (mean) 6.000000 (consensus) 6.000000 (Edward) 6.000000 (Ernie)	4.500000 (mean) 4.500000 (consensus) 4.000000 (Edward) 5.000000 (Ernie)	5.000000 (mean) 5.000000 (consensus) 4.500000 (Edward) 5.500000 (Ernie)	3.500000 (mean) 3.500000 (consensus) 3.000000 (Edward) 4.000000 (Ernie)
CRT-4	1.1.2 Screen Legibility	3.000000 (mean) 3.000000 (consensus) 3.000000 (Edward) 3.000000 (Ernie)	2.000000 (mean) 2.000000 (consensus) 2.000000 (Edward) 2.000000 (Ernie)	3.000000 (mean) 2.000000 (consensus) 2.000000 (Edward) 3.000000 (Ernie)	2.000000 (mean) 2.000000 (consensus) 2.000000 (Edward) 1.000000 (Ernie)
CRT-5	1.1.3 Weight as Carried	4.000000 (mean) 4.000000 (consensus) 4.000000 (Edward) 4.000000 (Ernie)	4.500000 (mean) 4.500000 (consensus) 5.000000 (Edward) 4.000000 (Ernie)	3.800000 (mean) 3.800000 (consensus) 4.500000 (Edward) 3.000000 (Ernie)	5.300000 (mean) 5.300000 (consensus) 5.500000 (Edward) 5.000000 (Ernie)

Bold numbers =
scores above
threshold

Analysis Facilities - View Scores

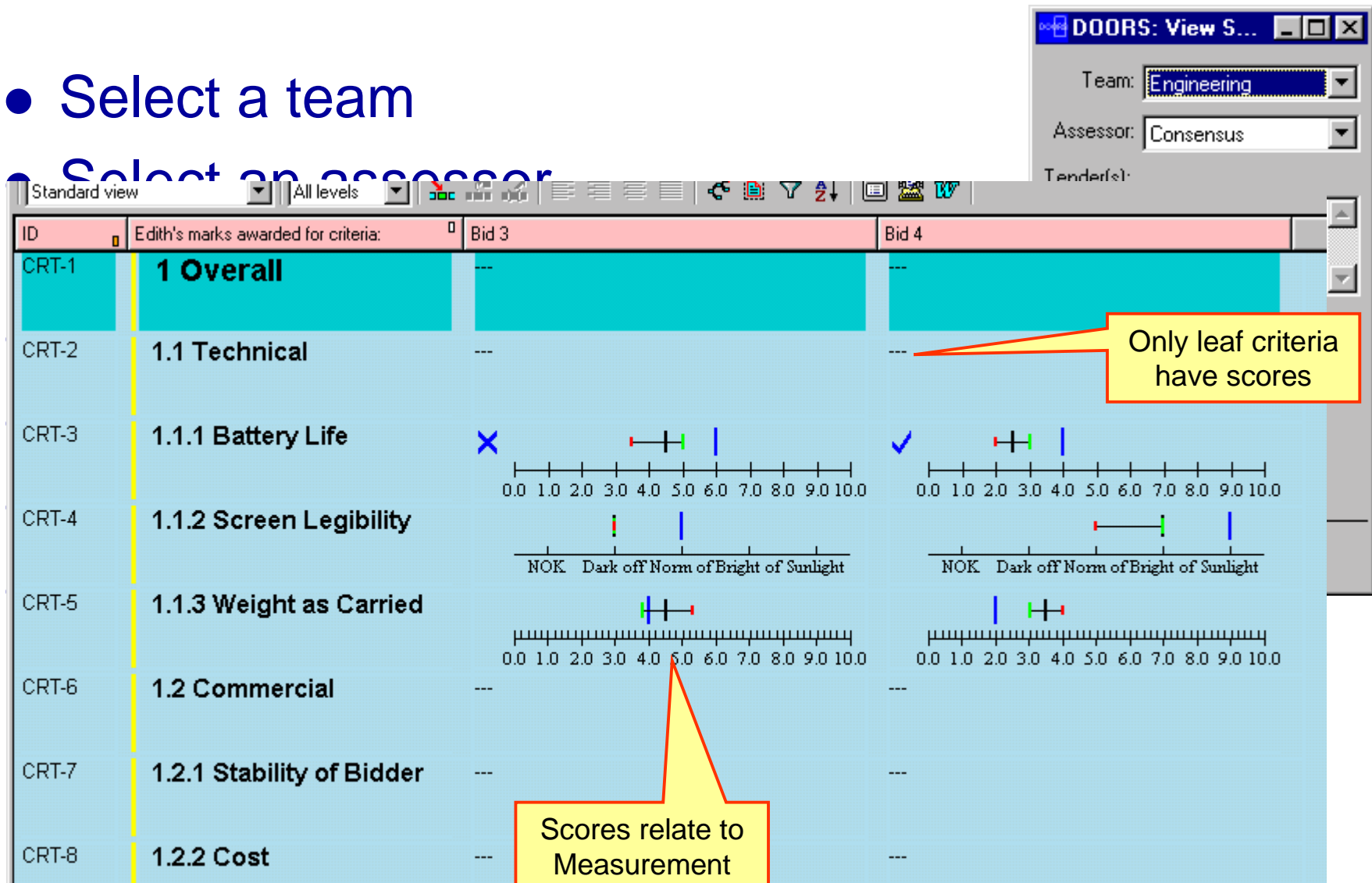
- Select a team
- Select an assessor
(Consensus = Team Leader)
- Select one or more Tenders
- Select display style
- Select/Reject Rationale
- Select Graphical/Textual presentation



Analysis Facilities - View Scores

- Select a team

- Select an assessor





Overall Benefits

- Clear well defined process
 - distinguishes key roles
 - automated by tool
- Information built up systematically
 - preparation (teams, criteria, tenders)
 - scoring (scorecards automatically created)
 - analysis (built in reports, customizable)
- Potential re-use of:
 - RFP templates
 - Evaluation criteria (e.g. domain specific)
 - Measurement scales