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Experiences with a Geographically Distributed CMMI Class C+ Appraisal



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ABB Overview



- Leader in power and automation technologies
- Enable utility and industry customers to improve performance while lowering environmental impact
- The ABB Group of companies operates in more than 120 countries and employs approximately 110,000 people
- ABB became the first company in the world to sell 100,000 robots
- Most ABB products have both software and hardware components
- ABB Corporate Research (CR) partners with business units (BU's) worldwide to improve ABB's products, services, and development processes.



Appraisal Background – 1



Customer: an ABB business unit (BU)**

Provider: ABB Corporate Research (CR)

- BU improvement goal:
 - ‘Raise the floor’ at 3 US sites sharing a common Quality System and building a shared set of organizational processes and tools
- “Class C+” appraisal purpose:
 - Objectively evaluate progress of the US organization relative to CMMI ML2 (v1.2) – as 1 organization, not 3
 - Class C + interviews, to increase confidence in accuracy
- Initially planned appraisal team composition:
 - 2-3 CR participants (software research/consulting)
 - 3 BU participants (1 from each site)

*** BU is not named or characterized, and specific outcome data has been partially sanitized, for confidentiality reasons.*



Appraisal Background – 2



Challenging factors:

■ Geographic

- Distributed organization (3 US sites in 3 different time zones)
- Part of a global division; a few key support functions recently centralized for all of US

■ Organizational

- Some common processes, some site-unique
- Managers with multi-site or global responsibilities
- Different types of projects, executed somewhat differently at each site

■ CMMI awareness

- Varying degrees of prior CMMI experience across BU
- BU1 and BU2 participants had no prior experience as appraisal team members; BU2 was fairly new to CMMI
- No opening or closing session desired



Appraisal Background – 3



Mitigating factors:

■ CMMI awareness:

- 1+ prior Class B/C appraisals by CR at each BU site (*wide awareness of CMMI within BU*)
- BU3 participant had prior Class B appraisal team member experience
- All CR participants experienced on/leading several CMMI appraisal teams (*general and with this BU*)

■ Organizational:

- Core BU improvement coordination team was established and involved (EPG)
- Increasing progress in BU towards common processes and shared document repository

■ Geographical:

- *None?*



Appraisal Strategy



Usual approach: All BU+CR appraisal team members travel, to all 3 locations, in turn

- ☺ Maximizes mentoring, F2F interviewing at sites, and in-person appraisal findings generation by team
- ☹ Costly in outlays, appraisal team member time, and schedule

Could we meet our appraisal goals with a leaner strategy involving less travel, time, and cost?

We labeled this usual approach “**option A**”, and began examining some alternative options for conducting the interviews and appraisal.



Interview Logistics – 1



Key concerns on remote vs. on-site interviews:

1. Minimize time demands for appraisal participation, plus travel costs, for BU
 - Schedule coordination was a major challenge
2. Interviewing effectiveness and accuracy
 - *Full engagement of all FAR participants is always a challenge, even when entire team is on-site!*
3. Maximize mentoring of BU appraisal team members (BU1 & BU2) by CR
4. Efficient findings generation by appraisal team

FAR = Functional Area Representative group (interviewees)



Interview Logistics – 2



Options for remote vs. on-site interviews:

- A. All BU+CR appraisal team members travel, to all 3 locations, in turn (usual approach)
- B. All BU+CR appraisal team members at one location
 - Remote-only interview connections to the other 2 sites
- C. One appraisal mini-team (BU+CR) at each of 3 sites
 - each site mini-team = home BU person + 1 CR person
- D. Hybrid – BU appraisal team members @ their home site, CR appraisal team members at 1 site

How do these 4 options stack up against the 4 criteria?



Interview Logistics – 3



Analysis of appraisal team interviewing alternatives:

Options:	A-Full team travels to all 3 sites	B-Full team @ 1 site	C-BU+CR mini-team per site	D-1 BU per site, all CR @ 1 site
Criteria:				
1-Time and travel costs	(default)	😊	😊 😊	😊 😊 😊
2-Interviewing effectiveness	(default)	😞 😞 😞	😞	😞 😞
3-Mentoring of BU by CR	(default)	S	😊	😞 😞
4-Findings generation	(default)	S	😞 😞	😞

Key: S=Same, 😊 = better, 😞 = worse (vs. default)



Based on Pugh Concept Selection technique (QFD/Six Sigma)

Interview Logistics – 4



How could we further strengthen option C?

- Seek out approaches to maximize mixed/remote interview effectiveness
 - Technology – videoconferencing/webcams?
 - Most experienced onsite team member leads local interviews
- Find other ways to mitigate interview accuracy risks
 - More thorough advance document review (can do remotely!)
 - Conduct additional phone interviews if needed
- Re-unite the appraisal team for findings generation, after interviews and tagging are completed locally
 - Feasible since no on-site findings presentation was planned
- Reduce travel further if BU3 ‘flies solo’

TSP-like ‘Site Coordination Guide’ created by CR to help manage these complicated arrangements.



Appraisal Plan: Interview Sessions



Criteria for scheduling across time zones:

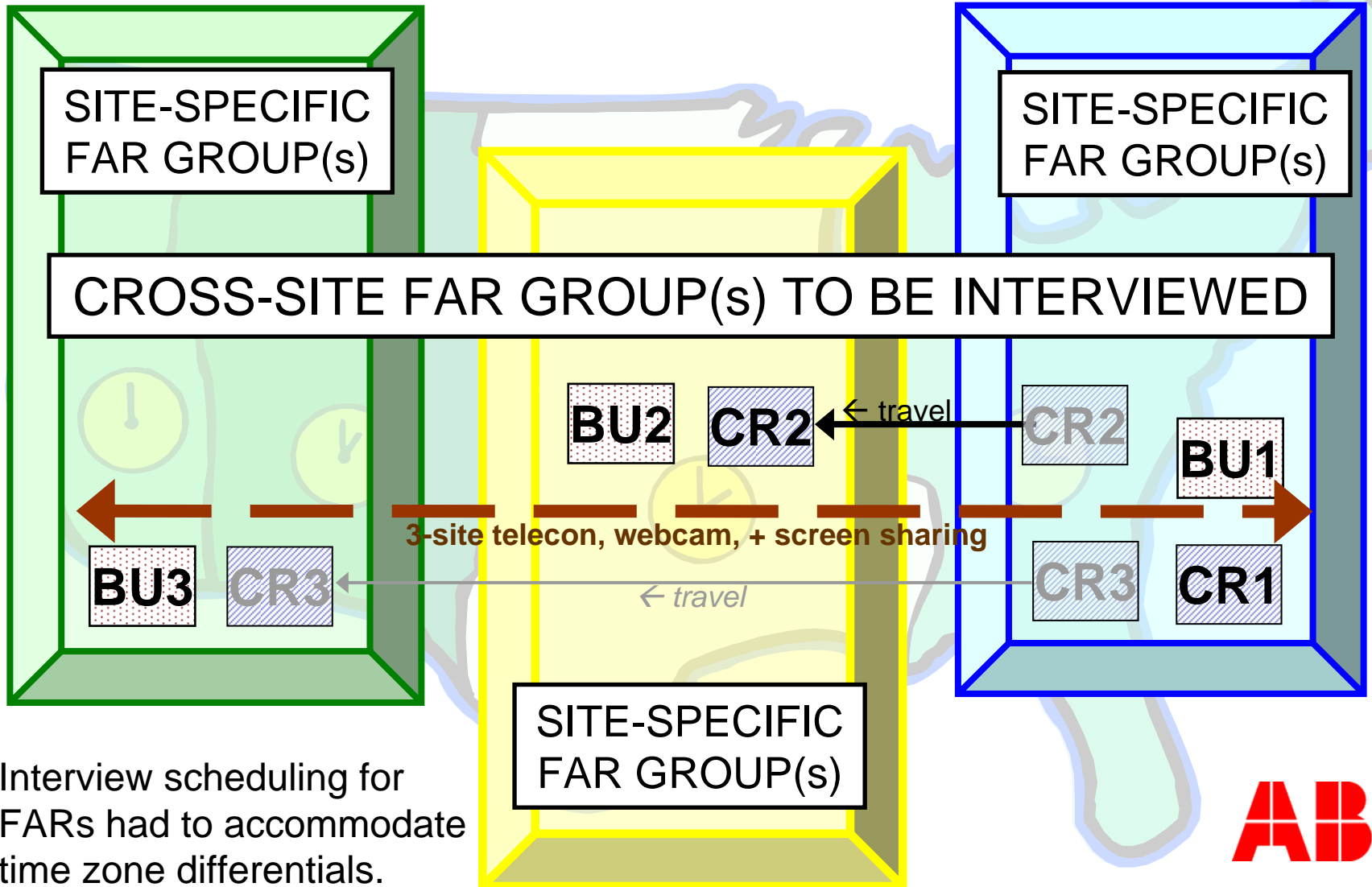
- Avoid sessions outside normal site work hours; minimize sessions over lunchtime
- Minimize total appraisal day length for the team
- Avoid conflicts with existing meetings at all 3 sites
- For small functional groups, combine participants from multiple sites into a single FAR
- One interview session per person, whenever possible
 - Many people wear multiple hats or work on cross-site projects
- Separate people with reporting relationships
 - *complicated by the BU-wide and global matrix structure*





Appraisal Plan: Interview Travel

Option C+ (1 BU+CR mini-team per site during interviews):



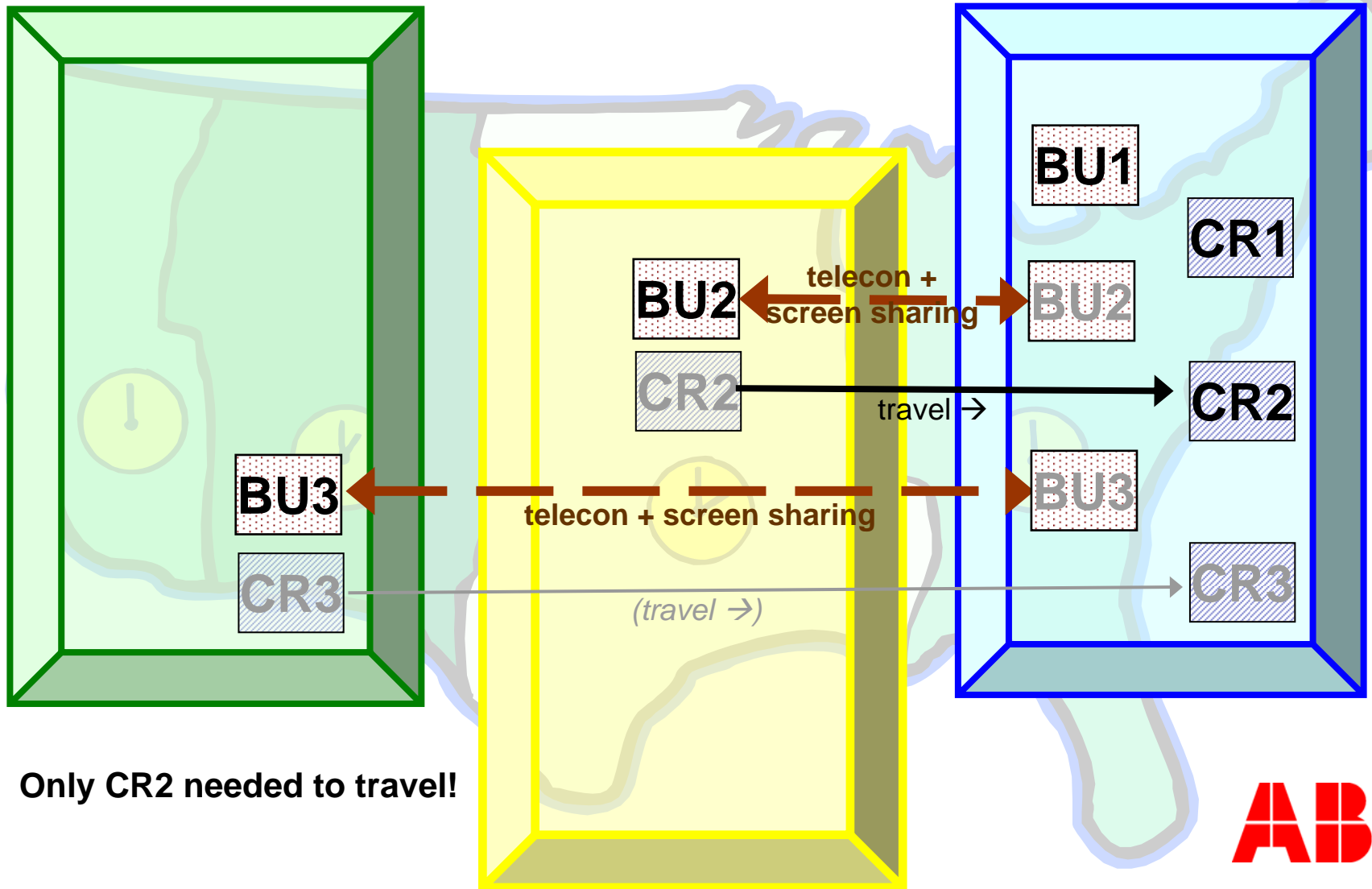
Interview scheduling for FARs had to accommodate time zone differentials.



Appraisal Plan: Findings Generation



Findings generation (after interviews) with Option C+ :





Appraisal Plan: Rating Scales – 1

Three sites with partially overlapping processes;
desire for a single set of unified findings

*What if one site was doing something well (green)
but another was not (yellow or red)?*

Our tailored ratings scale interpretations:

Rating Color	Meaning
Green	All three sites are green
Purple	All three sites are purple (or 1-2 green)
Red	All three sites are red
Yellow	otherwise

*Team agreed that Blue (not applicable)
would not be allowed for SAM.*



Appraisal Plan: Rating Scales – 2



How could we characterize our confidence in the accuracy of a finding for the whole organization?

- e.g. high confidence about 1 site, less about others

Our tailored accuracy scale interpretations:

Accuracy	Meaning
High	High confidence for all 3 sites
Medium	Medium or High confidence for all 3 sites
None	No observations captured for any site
Low	otherwise

Appraisal Execution: Benefits



- No travel for BU (and CR1) was much appreciated
 - Significantly reduced scheduling difficulties and total demand for BU time away from regular duties
 - Reduction of on-the-road time for CR2 was also welcome
 - Interviews were completed Monday-Wednesday, with ½ day of remote interviews the prior Friday
- Rotating interview lead to on-site CR person helped
 - Requires multiple ‘appraisal lead’-capable team members
- One-on-one BU mentorship in mini-teams worked well
- Partially-remote findings generation worked well enough for this appraisal
 - *but probably not well enough for a Class A?*

Appraisal Execution: Challenges – 1



- **Surprise:** Discovered more staff turnover since prior appraisals than we had expected
 - A few interviewees asking “what is CMMI” after receiving FAR session schedule notices
 - Pockets of CMMI un-awareness during interviews
- **Contingency:**
 - Quickly prepare/provide advance info on CMMI
- **Surprise:** Participants in prior appraisals were actually disappointed to not get questionnaires
 - Surfaced during interview ‘Golden Questions’
- Site Coordination Guide and Plan useful but did not ‘survive first contact’; both had to evolve



Appraisal Execution: Challenges – 2



Logistics at site 3 broke down somewhat ...

■ **Surprise:** BU3 became unavailable for local interviews

- *Discovered half a week before the appraisal*
- No one else in BU had appraisal team experience
- CR3 was no longer available to travel that week

Contingency:

- All interviews at site 3 would now be fully remote
- Alternate EPG member assigned to site 3 logistics

■ **Surprise:** Short-notice all-hands meeting with overseas VIP disrupted appraisal schedule

- *Discovered the day before his visit to site*

Contingency:

- Quick reshuffling of scheduled interviews; had to go outside normal work hours



Appraisal Execution: Challenges – 3



■ *Technical difficulties*

- Some webcam software conflicted with standard internal screen-sharing software
- Newer webcams could not connect from appraisal team rooms through corporate firewall
- One laptop not enough for lead appraiser use

■ *Remote interviewing weaknesses surfaced*

- Harder for interview leads to manage dominant respondents in fully/partially remote sessions
 - Exacerbated when BUx not present due to reporting conflicts
- Comprehension difficulties for remote note-takers
 - What: teleconferencing sound quality weak at times
 - Who: lack of visual cues on who was responding



Appraisal Outcome – 1



Practice Rating Counts for Maturity Level 2 PA's

	ReqM	PP	PMC	MA	SAM	PPQA	CM	Meaning	Totals
Green	1	2	9	4	1	1	3	Practice is being implemented by all sites of the organization	21
Purple	5	9	7	8	6	4	3	Organization (all sites) is largely implementing the requirements of the practice.	42
Yellow	6	11	4	4	9	8	8	Organization is partially implementing the practice or is not consistently performing the practice	50
Red	3	2	0	2	2	1	2	Organization is not implementing the practice or its implementation is ineffective	12
White	0	0	0	0	0	0	1	No observation made	1
Status	15	24	20	18	18	14	17		



Appraisal Outcome – 2



Generic Practice Ratings for Generic Goal 2

	ReqM	PP	PMC	MA	SAM	PPQA	CM
GP 2.1	Low-Y	Med-P	Med-P	Med-G	Med-Y	Low-G	Med-P
GP 2.2	Low-R	Low-R	Low-G	Low-P	Low-Y	Med-Y	Med-Y
GP 2.3	Low-P	Low-P	Low-G	Med-Y	Low-Y	Med-R	Med-Y
GP 2.4	Low-P	Med-G	Low-G	Low-P	Med-Y	Low-Y	Low-Y
GP 2.5	Low-Y	Med-P	Med-P	Med-G	Med-P	Low-P	Low-Y
GP 2.6	Low-G	Low-P	Med-P	Med-P	Med-Y	Low-Y	Low-Y
GP 2.7	Low-P	Low-P	Low-Y	Med-P	Med-P	Med-Y	W
GP 2.8	Low-R	Low-Y	Low-Y	Med-P	Med-Y	Low-Y	Med-Y
GP 2.9	Med-P	Low-Y	Med-Y	Med-Y	Med-Y	Low-P	Med-Y
GP 2.10	Low-R	Low-Y	Low-Y	Low-Y	Low-R	Low-Y	Low-R

Observation Confidence Level Summary: (126 ratings)

- High Confidence (all 3 sites) – none
- Medium Confidence – 66 (52.4%)
- Low Confidence – 59 (46.8%)
- No Confidence (no observations at any site; W) – 1 (0.8%)



Key Lessons Learned



■ Interview Effectiveness and Efficiency

- REQUIRE an experienced appraisal team member to be physically present at EACH site with interviewees
 - *if not possible, reschedule the appraisal*
- Restore use of advance questionnaires
 - *in addition to, or lieu of, 'Golden Questions'*

■ Logistics Improvements

- Have two computers in each interview room, not one
 - screen sharing, projection of question slides, webcams, and note-taking
- Find/arrange a better way to get visual feedback during future remote/distributed interviews
 - and do a dry run **in** the actual interview rooms to be used!
- Site Coordination Guide valuable; enhance it



Summary



Would we do a distributed appraisal again?

Yes:

- Reduced 'cost' to BU significantly
- Delivered good-enough results for our needs

But:

- Adjustments needed to reflect lessons learned
- Class B/C only; benefits probably not worth the risks for a Class A

ABB

Questions?



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