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Boundary Object Use in Cross-Cultural Software Development Teams

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Outline of Presentation

Research Process

Theoretical Approach

Case Context & Analysis

Key Findings

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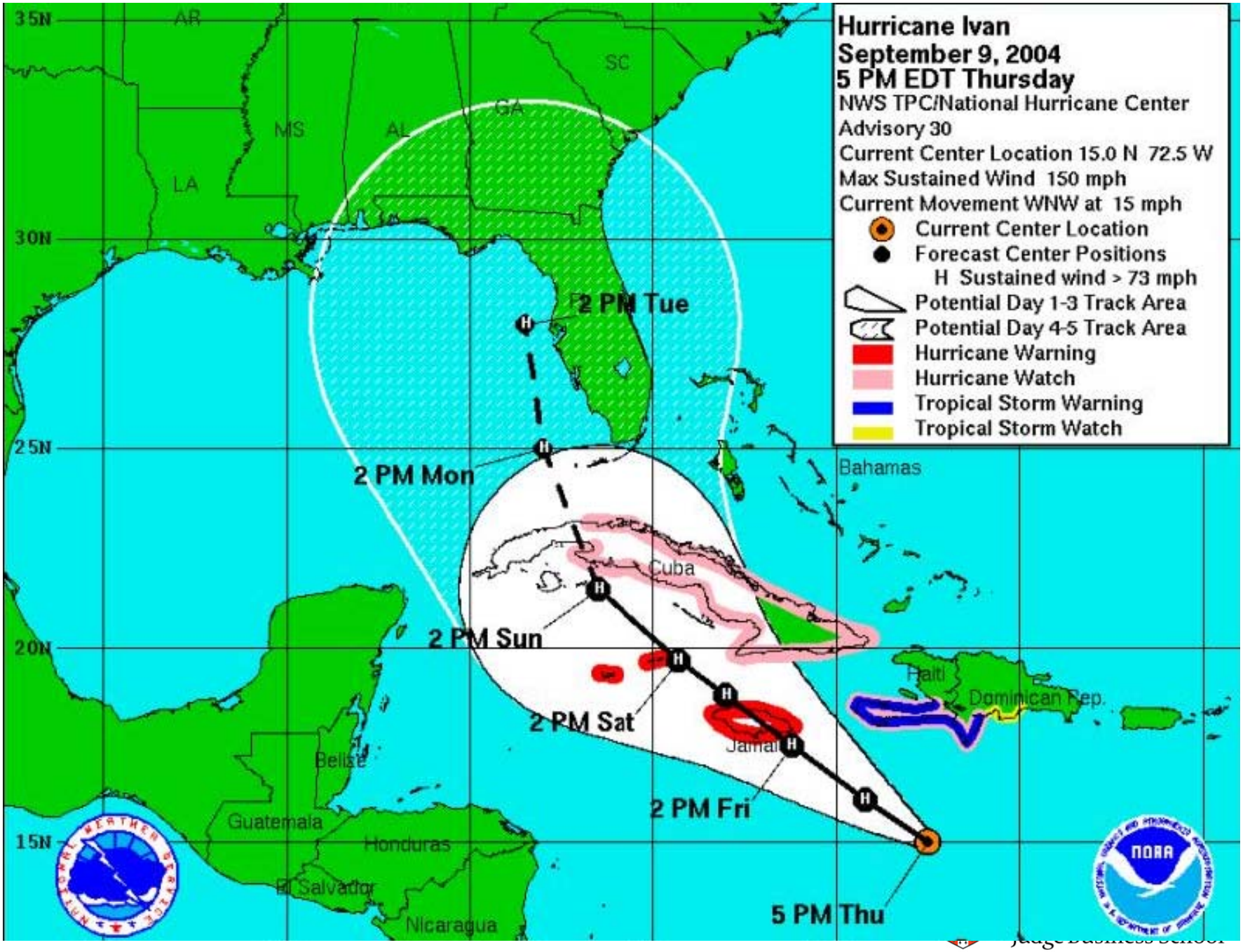
Hurricane Ivan
September 9, 2004
5 PM EDT Thursday
NWS TPC/National Hurricane Center
Advisory 30
Current Center Location 15.0 N 72.5 W
Max Sustained Wind 150 mph
Current Movement WNW at 15 mph
Current Center Location
Forecast Center Positions
H Sustained wind > 73 mph
Potential Day 1-3 Track Area
Potential Day 4-5 Track Area
Hurricane Warning
Hurricane Watch
Tropical Storm Warning
Tropical Storm Watch
35N
30N
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MS
AL
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2 PM Tue
2 PM Mon
2 PM Sun
2 PM Sat
2 PM Fri
5 PM Thu
Bahamas
Cuba
Haiti
Dominican Rep.
Jamaica
Belize
Guatemala
Honduras
El Salvador
Nicaragua
NOAA

Research Process

Role and Use of IT for Business Innovation in Jamaican insurance company

Cross Cultural software development across 3 phases over 2 years

- Phase 1: Industry level GIS and hazard mapping (12 interviews)

  - Cross cultural software team to meet needs of global reinsurers

- Senior managers of JAMSURE, project managers, team leaders, developers, users (42 interviews over 3 phases)

Data Analysis

- Open Coding
- Theoretical Perspectives
  - Late modernity and globalization
  - Knowledge sharing and Boundary Objects

- Researcher bias in cross-cultural research

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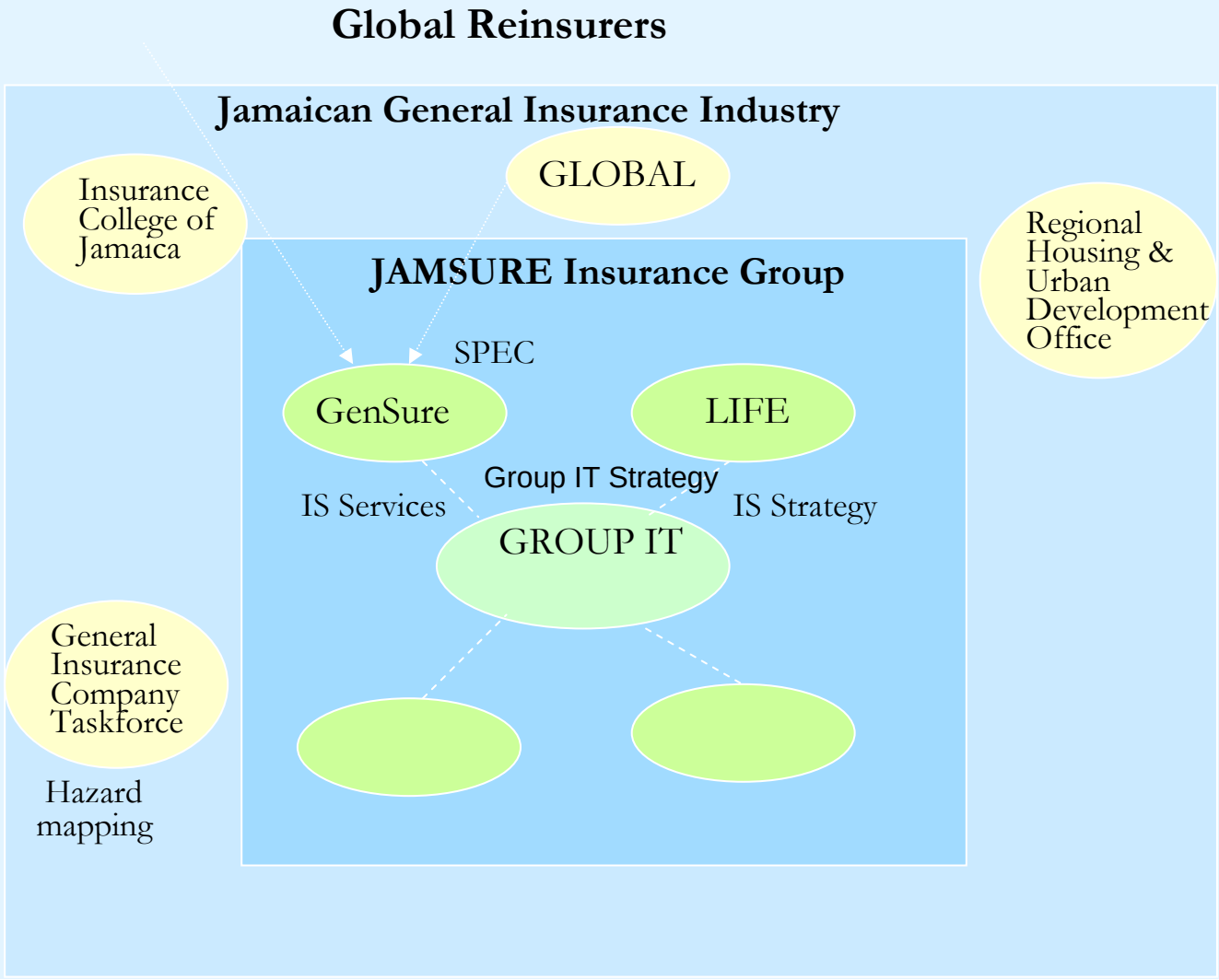
Key Fieldwork Entities and their Inter-relationships



Focus of Earlier Publications

Managing IT for Business Innovation

- Culture, Learning and Leadership

Exploring the impact of Cross-cultural Differences in International SD Teams

- Hofstede analysis

Cross cultural software production and use

- A structurational approach

Boundary Object Use in Cross-cultural SD Teams

- Unpack cultural explanations of ISD team conflict
- Processes underlying K-sharing associated with changing use of BO

Locating the Contribution

Boundary Object Use in a Cross-Cultural Context

- **Processes underlying K-sharing**
  - **Changing use of BO**
  - **Breakdown in k-sharing accentuates differences**
  - **Cultural boundaries more salient**

Research Question

How and why can the use of requirements specifications and project management tools by members of a cross-cultural software team facilitate both collaboration and conflict at different points in time?

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Boundary Objects

'Objects that are plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity' (Star 1989)

BO Coordinating and facilitating knowledge sharing *(Carlile 2004, Bechky 2003)*

- **Coordination challenges**
- **'Common Ground'**

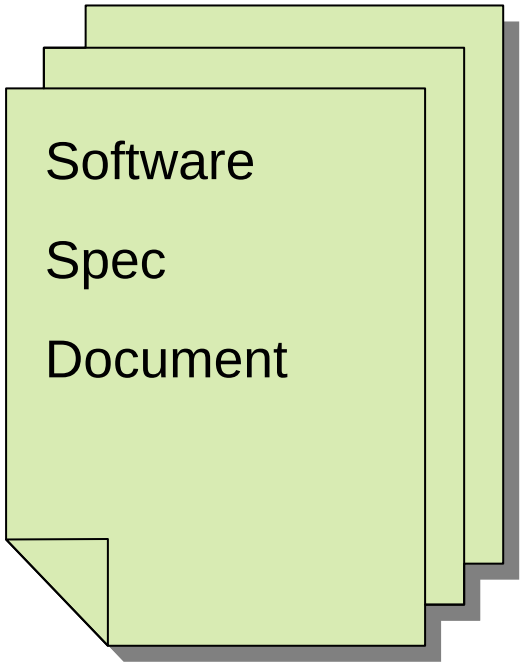
Object's roles (symbolic and instrumental) across different types of knowledge boundaries (Swan et.al. 2007)

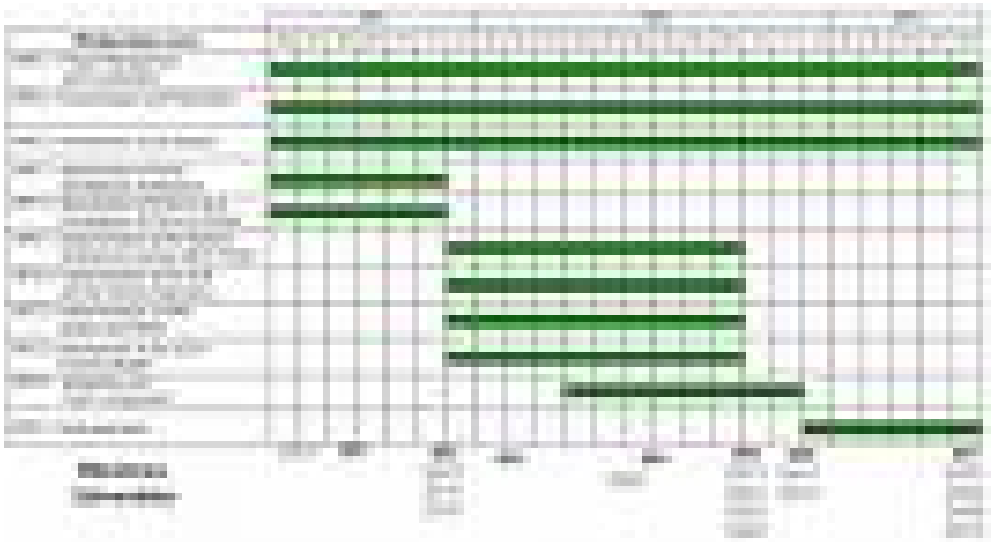
Dynamic view *(Levina and Vaast 2005)*

- ***Go* beyond level of properties and categories**
- **Boundary objects-in-use vs. designated boundary objects**

	Key concepts	Key References
Objects in ISD	***Functional elements***	
	-Coordination of knowledge and expertise	- Faraj & Sproull 2000, Desanctis & Jackson 1994
	- Requirements spec and project management tools as 'transition' objects for learning in ISD	-Wastell 1999
	- multidimensional nature	-Ewenstein and Whyte 2009
	Symbolic elements	
	-Highlight status inequalities	- Levina and Vaast 2008
	-Authority over objects can reinforce or redistribute task area boundaries	- Sapsed and Salter 2004
Boundary objects	***Types***	
	- Diverse types facilitate sharing across groups	- Star 1989, Star and Griesmer 1989
	- Concrete, visionary, ideal	- Carlile 2002, Briers & Chua 2001
	- Include ISD tools such as project management, specs	- Henderson 1991
	- Designated or in-use	-Levina & Vaast 2005
	Function	
	- Timelines are interpretively flexible, and as temporal BO offer closure as illusion of control	-Yakura 2002
	- Capacity to adapt to local dialects and be flexible to localization	-Lindkvist et.al. 1998, D'Adderio 2004
	- Not easily substituted with other objects	- Henderson 1991
	-Suitability for different knowledge boundaries including pragmatic boundaries which can arise from vested interests	-Carlile 2002, Swan et.al. 2007, Carlile 2004
	- Represent jurisdictions and status	- Bechky 2003
	- Reinforce boundaries and authority	- Levina and Vaast 2006
Cross cultural working and ISD teams	-Conflict in ISD due to lack of user involvement; engagement; power and status dynamics	- Robey 1989; Metiu 2006; Markus 1983, Levina and Vaast 2008
	-Cultural diversity contributes to task and relational conflict in ISD	-Barrett et.al. 1996; Walsham 2002
	- Knowledge sharing challenges in cross-cultural working	-Ford and Chan 2003, Peltokorpi 2006
	- Multiple overlapping boundaries give rise to status differences and inhibit collaboration	-Levina and Vaast 2008
	- Cultural boundaries as product of social processes	- Wimmer 2008

Boundary Objects in Software Development





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Our BO Perspective

Pluralist and Interactional

- Collaboration and conflict

- BO brought to life through social interaction as actors negotiate collective meaning

- Tacit knowing and BO Use across Knowledge Boundaries

    - Polanyi's tacit knowing

    - Different groups draw on functional and cultural clues of BO to derive meaning across knowledge boundaries

Case in a Nutshell…..

GLOBAL commissioned to develop ‘spec’

GROUPIT set up

Dr Prava – ‘Technical and scientific manager’

GROUPIT have difficulty developing GENSYS from the ‘spec’

GENSURE MIS department join GROUPIT

Successful early phase of development

Development problems

‘Cross-cultural’ conflict and ‘grievance’ meeting

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Case Analysis:

Exploring boundary object use in cross-cultural software development

Phase 1: From initiation to collaboration

- Spec Use across Indians and Jamaicans was collaborative
- Time lines and project meetings symbolically used to positively reinforce and reward collaboration

The project started off well. GENSURE and GROUPIT personnel lost identity and all became part of the GENSYS team…there were awards for most helpful member and project champion (GROUPIT developer)

'Honeymoon Phase'

At the start, everything was in a tailspin with a steep learning curve, and everybody was helping each other debug one another's programs..after the honeymoon period when morale was high and excitement about using cutting edge technology a culture clash set in. (GENSURE Team Leader)

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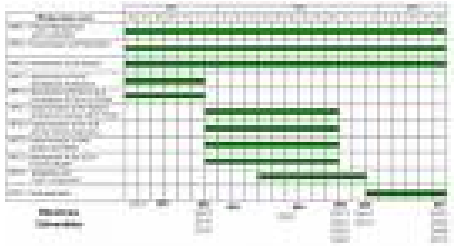
Phase2: Imposed BO use at mid point transition

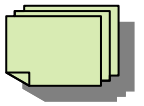
Deadlines

*Though teams were (initially) compliant, deadlines [became] rather stringent, if not unreasonable…*A lack of trust developed between development teams. It became so competitive…competitive behaviour demoralized other teams*…(Jamaican developer)*

Lack of Knowledge Sharing creeps in..

The approach taken to writing programs was similar to baking buns (sweet bread) on a conveyor belt…the questioning was direct ‘have you finished all the programs you are committed to, yes or no’…there was not much consideration that we were unfamiliar with 4GL programming and there was a necessary learning curve





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Phase 3:
BO use and cross-cultural conflict in post transitional team interaction

Critical Sharing of Technical Knowledge Stopped

> ‘ The attitude changed to the Indians not assisting or sharing their skills and knowledge….bad blood developed between Jamaicans and Indians’

Increasing salience of cross cultural differences and social boundaries

> Team conflict and cultural stereotyping

> ‘There was an atmosphere of mistrust and resentment which resulted in a lack of ownership and political tensions…the culture differences gave way to mistrust and a blame culture ensued’

Key Findings I

Key Interacting Elements influence BO use in team

Early Phases of IS Development

- Reqts spec and flexible use of timelines facilitates k-sharing and collabn in team
- Open work climate and interdependence and mutual recognition and valuing of K

Subsequent Phase

- Project manager asserts managerial authority through deadlines and coding to spec
- Formal coordination and control
- Interactional tacit knowing replaced by individual level explicit k focus on 'coding to spec'

Final Phase

- Distribution of power and authority to Indian technical group
- Subsequent negative stereotyping led to ineffective BO use in bridging k across diverse groups
- STEREOTYPING and 'us and them' boundaries

  Reinforces lack of knowledge sharing

  Increased salience of national culture

  Relational conflict and ***culturizing***

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Key Findings II

Team Development Literature

- 'Forming' followed closely by collaboration and 'performing'
- Interdependence and symmetrical valuing of knowledge
- ***Culturizing*** illuminates role of BO use in 'storming' within cross-cultural teams and a negative 'norming' and no subsequent 'performing'

Managers of cross-cultural software teams

- Go beyond 'cross cultural differences' as only reason for relational conflict
- Awareness of how Interactional elements affect BO use and k sharing around midpoint transition