

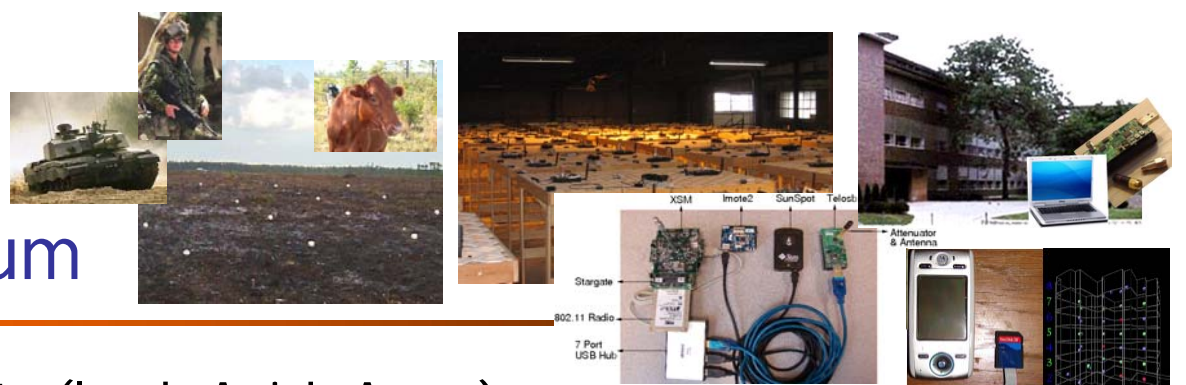
Federated, Autonomous *Kansei* Wireless Sensor Networks

Hongwei Zhang, Wayne State University
representing *Kansei Consortium*



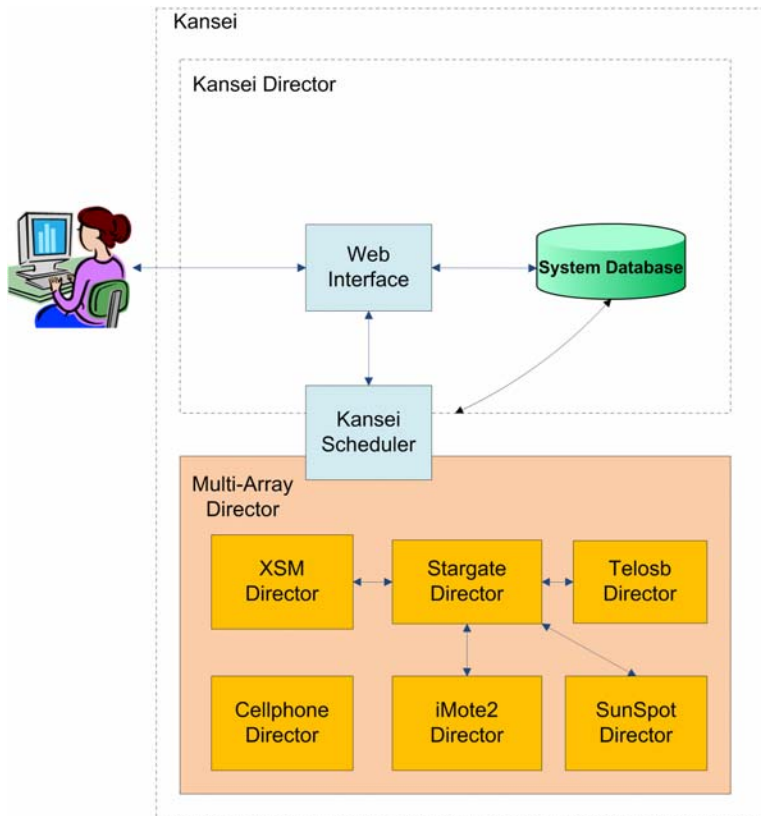
Thanks: Anish Arora

Kansei Consortium

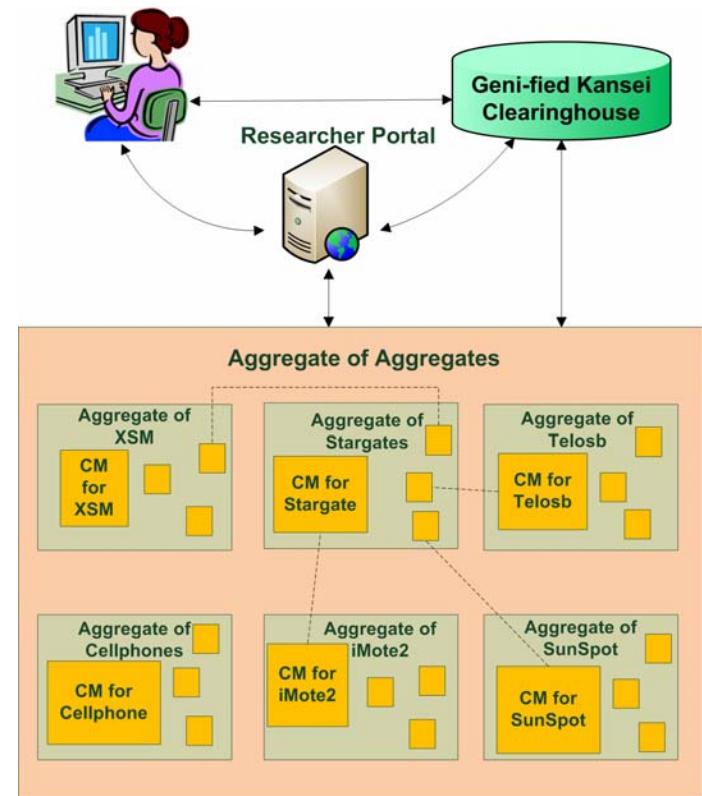


- Ohio State University (lead: Anish Arora)
 - XSM motes: 112 static array, 1,800 portable array
 - TelosB (IEEE 802.15.4): 432 (will be expanded to 1,000 soon)
 - Stargate (802.11b): 112
 - iMote2 (802.15.4): 112
 - Sun SPOT (802.15.4): 20 (Squawk Java VM)
 - Cellphone-Mote: 35 (will be expanded to 70 mobile nodes soon)
- Wayne State University (lead: Hongwei Zhang)
 - TelosB: 130
 - Dell Vostro laptops (802.11 b&g): 16
 - Mobile cellphone-mote array being planned
- Los Alamos National Lab (lead: Sami Ayyorgun)
 - TelosB: 138
 - Stargate: 22
- ETRI (Korea) and two India universities are expected to join soon

Architecture



Current Kansei Architecture



Geni-fied Kansei Architecture

	GENI API		Corresponding Kansei API
Clearinghouse	CreateSliceName()	Kansei Director	CreateGroup()
	FreeSliceName		DestroyGroup()
	UserInfo = ResolveSliceName		TBD
	PublishTopology(Array)		AddNewArray()
	GetRSpec()		TBD
	GetUserServices		TBD
Researcher Portal	User service	Kansei Director	ScheduleJob()
	AddFile()		AddFile()
	StopSlice(), ReceiveSignal() DestroySlice(), GetFile()		KillJob()
	ExecuteFile()		GenerateExecutable()
	GetStatus()		GetHealth()
	GetTicket()		CreateGroup()
	ProgramSliver()		ProgramArray()
Component / Aggregate Manger API	ExecuteFile()	Device Directors	Device directors provide similar functions as Component / Aggregate Managers, except that their functions are not exposed to researchers
	PutFile()		
	GetFile()		
	ProgramSliver()		
	Ticket= GetTicket()		
	StopSlice()		
	StartSlice()		
	DestroySlice()		
	ReceiveSignal()		
	GrantPrivilege()		
	ConfigureNetwork()		
...

Example Kansei functionalities:

- Slivering/slicing:
 - Frequency-division slivering for concurrent experiments
 - Time-division slivering for sequentially scheduled experiments

- Health monitoring and feedback

Technology roadmap

- GENI-fication of individual sites
 - Software package (or wrapper) for quickly GENI-fying similar testbeds
 - Convenient incorporation of new technologies/products (e.g., Sun SPOT, Cellphone-mote)
- Federation of autonomous sites
 - Access control
 - Federated resource management
- Integration with other WSN, edge, and core substrates