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Software Structured Design & Architecture

Assignment 2

availability

pattern	Availability										
	DetectFaults			Recovery - Preparation			Recovery - Reintroduction		Prevention		
	Ping/Echo	Heartbeat	Exception	Active Redundancy	Passive Redundancy	Spare	Shadow	StateResynchronization	Removal from Service	Transcations	Process Monitor
Layered			x								
Pipes and Filters	x		x							x	
Blackboard					x			x			
Broker	x		x	x				x			
MVC			x								
C/S	x		x					x			
P2P	x		x								
SOA		x	x								
Publish-Subscribe			x					x			
Presentation Abstraction Control			x								

benefits:

Pipes and Filters：Has a means to detect and handle faults,so that it can be detected and responded in time

Broker：Has a means to detect and handle faults,so that it can be detected and responded in time

P2P：Multiple paths are available.

SOA：Provide a reliable mechanism to support

penalties:

When the complexity of each pattern increases, it will cause certain instability.

not associated:

Shadow、ProcessMonitor：Related to hardware, there are not many applications in software

interoperability

pattern	Interoperability		
	Locate	Manage Interfaces	
	Discover Service	Orchestrate	Tailor Interface
Layered		x	x
Pipes and Filters		x	x
Blackboard		x	x
Broker	x	x	x
MVC		x	x
C/S		x	x
P2P		x	x
SOA	x	x	x
Publish-Subscribe		x	x
Presentation Abstraction Control		x	x

benefits:

These patterns have good interface design and encapsulation, so they have high interoperability.

performance

pattern	Performance	
	Control Resource Demand	Manage Resources

	Increase Computation	Limit Event Response	Reduce Overhead	Bound Execution Times	Introduce Concurrency	Increase Resources	Schedule Resources
Layered							
Pipes and Filters					x		
Blackboard							
Broker							
MVC							
C/S	x						
P2P	x						x
SOA							
Publish-Subscribe					x		
Presentation Abstraction Control					x		

benefits:

Pipes and Filters：Improve performance.Introducing concurrency.

P2P：In some cases, P2P systems can achieve direct data transfer, thereby improving performance.

Publich-Subscribe：Takes a parallel mechanism

PAC：Completely isolate presentation and abstraction based on mvc and improve the performance.

penalties:

Layered：Reduce the performance.

Pipes and Filters：Performance is affected when dealing with interactions

Blackboard：Increased complexity leads to reduced efficiency

Broker：Reduce some performance. Added a layer of Broker message forwarding, which has reduced efficiency.

MVC：Depending on the model's operational interface, the view may need to be called multiple times to get enough display data. Unnecessary frequent access to unchanging data will also impair operational performance.

P2P：Small P2P systems may not to consistently achieve quality goals such as perfomance and availability.

PAC：Depending on the model's operational interface, the view may need to be called multiple times to get enough display data. Unnecessary frequent access to unchanging data will also impair operational performance.

not associated:

Increase Resources：This tactics can be placed in the deployment of hardware resources, which is not obvious in the design pattern.

security

pattern	Security								
	Detect Attacks		Resist Attacks			React to Attacks		Recover from Attacks	
	Detect Intrusion	Message Integrity	Identify Actors	Encrypt Data	Separate Entities	Revoke Access	Lock Computer	Maintain Audit Trail	Restore
Layered									
Pipes and Filters			x	x			x		
Blackboard									
Broker			x	x		x	x		x
MVC									
C/S	x		x			x		x	x
P2P									
SOA	x		x	x		x		x	x
Publish-Subscribe				x		x		x	
Presentation Abstraction Control									

benefits:

Pipes and Filters: Provide the ability to detect intrusions and encrypts information, improving system security.

Broker: Provide the ability to detect intrusions and encrypts information, improving system security.

C/S：Improve security. All data is stored on the server, and the server has better control over access

SOA：More robust security mechanism

penalties:

P2P：Reduce security. P2P system cannot identify user identity due to environmental restrictions

not associated：

Separate Entities： based on hardware

testability

pattern	Testability				
	Control and Observe System State			Limit Complexity	
	Specialized Interfaces	Record/Playback	Abstract Data Sources	Limit Structural Complexity	Limit Nondeterminism
Layered	x		x	x	x
Pipes and Filters			x	x	x
Blackboard			x		
Broker				x	
MVC	x		x		
C/S	x			x	
P2P					
SOA	x				
Publish-Subscribe	x			x	
Presentation Abstraction Control	x		x		

benefits：

Layered：Testability can be enhanced because each layer can be tested independently.

Pipes and Filters：Divide functions and control complexity to a certain extent

MVC：Testing can be performed separately in m, v, and c

C/S：The client and the server can be tested separately and then tested interactively.Improve the **testability**.

Publish-Subscribe

PAC

penalties:

Blackboard：Reduce testability(Increased complexity)

Broker：Testability requires attention with increased testing work.

not assosiate:

executable assertions、sandbox：is a kind of technical means

usability

pattern	Usability						
	Support User Initiative				Support System Initiative		
	Cancel	Undo	Pause/Resume	Aggregate	Maintain Task Model	Maintain User Model	Maintain System Model
Layered						x	
Pipes and Filters	x	x	x		x		x
Blackboard					x	x	x
Broker	x	x	x				
MVC						x	
C/S	x	x	x		x	x	x
P2P	x	x	x		x	x	x

SOA	x	x	x		x	x	x
Publish-Subscribe	x	x	x		x	x	x
Presentation Abstraction Control						x	

benefits:

Pipes and Filters：Communication detection can be performed while connected

SOA：Due to the loose coupling between service providers and service users, and the adoption of open standard interfaces, it has maintainability and usability.

C/S

P2P

Publish-Subscribe

penalties:

Layered：Reduce the usability.

not assosiated：

Aggregation cannot be implemented in architecture design