Chapter 1 - Requirement Patterns

Category	Pattern	Template	Example
Data Longevity	General	<Data description> shall be [moved]/ [copied] from <Data origin> to <Data destination> <Frequency> <Initiator>.	Customer orders and all details pertaining to each order shall be eligible to be moved to an offline storage medium a configurable number of days (expected to be of the order of 90 days) after the whole order has been fulfilled and actually moved the next time the order archiving process is run thereafter. The resulting offline storage media shall be retained indefinitely.
Data Archiving	General	<Data description> shall be stored <Manner of storage> for <Retention duration> from <Duration start trigger>.	Customer orders shall be retained online for 90 days from the date the order was shipped.
Response Time	General	Each «Operation type» shall have a response time of no more than «Tolerable length of time» from «Timing boundary start» to «Timing boundary end» [when using «Indicative hardware set-up»]. This figure is based on «Justification». [This requirement does not apply to «Exceptional cases».]	Any inquiry shall complete the display of its results, from the time the user submits the request, in no longer than 4 seconds plus the display time of a simple reference page from the same location. This figure is based on anecdotal tests indicating that users begin to lose patience soon after this time. This requirement does not apply to inquiries across large volumes of data where arbitrary selection criteria are allowed.
	General		The average time for the transaction switch to route a customer request to a service shall be less than 300 milliseconds.
	Average Transaction	Average time of <transaction completion> shall not be greater than <time period>.	Average time of returning a list of flights shall not be greater than ten seconds.
	Range	The solution shall <transaction completion> within <time range>.	The solution shall retrieve an inmate record within 3-7 seconds.
Throughput	General	«Part of system» shall be able to handle «Throughput object type» transactions at a rate of at least «Throughput quantity» per «Unit time period» [when using «Indicative hardware set-up»]. [«Target achievement timeframe statement».] [«Contingency statement».]	The initial system shall be able to handle the entry of orders by customers at a rate of at least 10 per second. No contingency has been added; this rate represents the actual demand expected. See the system sizing model for details of how this figure has been arrived at. It is located at «Sizing model location».
	Transaction Throughput	The system shall accommodate <number> <transaction type> per <time period>.	The system shall accommodate 1,000 booked flights per minute.
Dynamic Capacity	General	The system shall be able satisfy «Entity count» simultaneous «Entity type»s «Entity condition statement» [«Duration of peak statement»]. [«Achievement timeframe statement».] [«Peak period concession statement».]	The system shall accommodate 100 customers logged in and active simultaneously. A user is deemed to be active if they have submitted a request to the system in the past five minutes.

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	General		The system shall accommodate 200 customers logged in and active simultaneously when tickets for a popular concert go on sale—from half an hour before the published sale time until two hours afterwards. The definition of active customer is as given in the previous requirement. During a popular concert initial sale peak, it is acceptable for secondary services offered by the Web site (including any involving large downloads or the streaming of audio or video) to be shut down. It is also acceptable to prevent internal users from accessing any functions that involve intensive processing.
Static Capacity	General	The system shall be able to handle a minimum of «Entity count» «Entity type»s. «Entity inclusion criteria». [«Achievement timeframe statement».]	The system shall be able to handle a minimum of 50,000 customers upon initial installation.
			The system shall eventually be able to handle a minimum of 1,000,000 customers. This figure covers only those customers who have accessed the Web site in the past three months or placed an order within the past twelve months. It is not expected that this level of business will be reached earlier than two years after initial implementation.
	Total Users	Total number of defined users (all users defined in Active Directory).	The solution shall support at least 1000 defined users.
	Active Users	Total number of active users (all users interacting with the systems on a daily and/or weekly basis)	The solution shall support at least 800 active users.
	Concurrent Users	Total number of concurrent users (Total number of user using the system simultaneously during the peak window)	The solution shall support at least 500 concurrent users.
	User Types	Total number of users by type.	The solution shall support at least 1410 active Physicians. The solution shall support at least 1410 active Nurses.
Availability	General	The system shall normally be available to users «Availability extent description» [, except in exceptional circumstances of a frequency and duration not to exceed «Tolerated downtime qualifier»]. "Normally available" shall be taken to mean «Availability meaning».	The system shall normally be available to users «Availability extent description» [, except in exceptional circumstances of a frequency and duration not to exceed «Tolerated downtime qualifier»]. "Normally available" shall be taken to mean «Availability meaning».
	Mean Time Between Failure (MTBF)	Percentage of time the system is available, mean time between errors. The <<system name/component>> shall be at least <<duration>>.	The Portal Mean Time Between Failures (MTBF) shall be at least 30 days.
	System Availability	The <<system name/component>> shall be available <percent>% of the time.	The Repository shall be available 99.93% of the time.

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Scalability		The system shall be scalable to accommodate an unrestricted number of «Type of item to be scalable»s. «Indicative high business volume». [«Ease of expansion statement».]	The system shall be scalable to accommodate unrestricted growth in the number of customers (prospectively to several hundred thousands).
			The system shall be scalable to allow its use by an unrestricted number of distributed offices of the company. (Eventually there could be over one hundred offices.)
			The document management system shall be scalable to manage an unrestricted number of electronic documents. (There could be millions of such documents, with a total size of several terabytes.)
	User Growth	The solution shall support <percent>% user growth <time period>.	The solution shall support 20% user growth after system roll-out completed.
	Data Volume	The solution shall support <number> of <entity type> within <time period>.	The solution shall support 300,000 inmates records during 1st year of operation.
	Message Volume	The solution shall support <number><unit of message> of <message type> between <other system>.	The solution shall support 2,500,000 (msg/year) of Lab Data between Foundation (msg/year).
	Locations	The solution shall support <number> <locations > within <time period>.	The solution shall support 33 institutions during the 2st year of operation.
Installability		It shall be possible for the «System part» to be installed by a «Person who will install». «Ease of installation statement». [«Installation medium statement».]	It shall be possible for the Web Shop client application to be installed by a typical customer who has no special expertise. The installation process shall be convenient and involve the entry of little information by the user. The client application shall be downloaded from the service's Web site.
			It shall be possible for the system's main (server) software to be installed by a competent system administrator who has no previous knowledge of the system or of the third-party products it uses (but who is familiar with the operating system of the machines on which it is to be installed).
	Software Upgrade	A new version of <software configuration item> shall be no longer than <time period>.	Deployment time on a new version of WebSphere Application Server shall be no longer than one day.
	No client installation	No installation on the client's workstation shall be required. All system upgrades and new releases should be done on the server.	
Recovery	Recovery Time	In case of a system failure, a redundant system shall resume operations within <time period>.	In case of a system failure, a redundant system shall resume operations within 30 seconds.
	Mean Time to Repair (MTTR)	Sum of the number of time units required to repair the system/ Number of repairs during the time period. Average repair time shall be less than <time period>.	·Average repair time shall be less than one hour. ·The solution shall repair 90 percent of all system failures within 5 minutes and that 99.9 percent of all failures must be repairable within 1 hour.

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	Startup/ Shutdown	The length of time it takes to start up and shut down. The system shall be operational within <time period> of startup up.	The system shall be operational within one minute of starting up.
	Recovery Time Objective (RTO)	The duration of time and a service level within which a business process must be restored after a disaster (or disruption) in order to avoid unacceptable consequences associated with a break in business continuity. It includes the time for trying to fix the problem without a recovery, the recovery itself, tests and the communication to the users. Decision time for users representative is not included.	The system shall be restored within 3-7 days during the first and second years of operation. The system shall be restored within 72 hours starting the third year of operation.
	Recovery Point Objective (RPO)	Describes the acceptable amount of data loss measured in time. The Recovery Point Objective (RPO) is the point in time to which you must recover data as defined by your organization. This is generally a definition of what an organization determines is an "acceptable loss" in a disaster situation. If the RPO of a company is 2 hours and the time it takes to get the data back into production is 5 hours, the RPO is still 2 hours. Based on this RPO the data must be restored to within 2 hours of the disaster.	The solution shall restore data as of previous business day.
	Client restart	When the server becomes usable again (perhaps because it was rebooted), clients shall not have to be restarted, and should resume working normally.	
		Log files shall be preserved across restarts and not be lost or overwritten.	
Testability	Automated Testing	The user interface shall not contain any components that would prevent automated testing using <tools>.	The user interface shall not contain any components that would prevent automated testing using IBM Rational Robot and IBM Rational Functional Tester.
Maintainability	Remote Access to Error Log	An error log containing information about all critical errors shall be accessible to the system administrator over the Internet so that it can be checked remotely at any time.	
	Secure log	All exception information shall be logged in a secure manner, and the exception shall then be replaced with a generic exception indicating an authentication or authorization failure, as appropriate.	

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Compatibility	Backward compatible	After the system is in production, subsequent versions of the system shall be backward-compatible. All transactions entered in previous versions shall be available in the new version.	
Portability	Replace component	Changing the system database in the future shall not require rewriting application logic.	