



Designing System Architecture

5.7 Architecture Evaluation and Refinement

Cost-Benefit Analysis

- A cost–benefit analysis is a widely used business tool for estimating and comparing the costs and benefits of a proposed change

Architecture Evaluation and Refinement

Computing Benefits

- A cost-benefit analysis contrasts financial benefits with financial costs, both in Dollars
 - Costs
 - Development
 - Operational
 - Benefits
 - Reduced Operational Costs
 - Increased Earnings
- Payback period
 - the length of time before accumulative benefits recover the costs of implementation

TABLE 5.4 Cost-Benefit Analysis of Design Proposals

	Eliminate Noise Words	Store Indices in Bins	Add Second Server
Benefits			
Search time	0.015 sec	0.002 sec	0.008 sec
Throughput	72 requests/sec	500 requests/sec	115 requests/sec
Added value	\$24,000/yr	\$280,000/yr	\$110,000/yr
Costs			
Hardware			\$5,000
Software	\$50,000	\$300,000	\$200,000
Business losses	\$28,000+/yr		
Total costs first year	\$78,000	\$300,000	\$205,000

Architecture Evaluation and Refinement

Computing Benefits (Continued)

- Return on Investment (ROI)
 - $\text{ROI} = \text{Benefits} / \text{Cost}$, $\text{ROI} > 1$ is desired
 - %age gain $\text{ROI} = (\text{Benefits} - \text{Cost}) / \text{Cost} \times 100$
 - Example
 - After five years
 - Cost = \$ 2249559
 - Benefits = \$ 6122893
 - $\text{ROI} = 2.72$ i.e. Total benefits are approx. 3 times the total costs
 - %age gain $\text{ROI} = 172.19\%$ i.e. Your earnings are 172.19 % of the total costs