

# System Design Interview: Incremental Scaling Checklist

A systematic approach to identifying bottlenecks and proposing solutions

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Use this checklist during practice interviews to build the habit of identifying bottlenecks systematically and proposing targeted solutions incrementally. Work through each step in order to mirror how real systems scale over time.

## STEP 1: IDENTIFY FIRST BOTTLENECK

- Analyze current design under 100x traffic increase
- Ask: Which component fails first? (usually database reads or API servers)
- State the bottleneck explicitly: "The first bottleneck will be..."

## STEP 2: PROPOSE TARGETED SOLUTION

- Describe ONE solution that addresses this specific bottleneck
- Explain how it works (2-3 sentences)
- Add it to your diagram

## STEP 3: EXPLAIN TRADE-OFFS

- Present 2 alternative solutions
- Compare trade-offs (latency, cost, complexity, consistency)
- Make a choice based on stated constraints

## STEP 4: IDENTIFY NEXT BOTTLENECK

- With first solution in place, what breaks next?
- Common progression: reads → application servers → writes → cross-region
- State the new bottleneck

## STEP 5: REPEAT INCREMENTALLY

- Propose solution for new bottleneck
- Explain trade-offs
- Check time remaining before adding another layer

## COMMON BOTTLENECK PROGRESSION PATTERNS

### URL Shortener:

1. Database reads → Add caching
2. API servers → Add load balancer + horizontal scaling
3. Database writes → Implement sharding
4. Global latency → Add CDN + regional replicas

### Message Queue:

1. Message throughput → Partition topics
2. Consumer lag → Add consumer instances
3. Message persistence → Implement tiered storage
4. Cross-region → Multi-region replication

### Social Feed:

1. Read fanout → Implement push model with caching
2. Write amplification → Hybrid push-pull model
3. Hot users → Separate caching tier for popular content
4. Real-time updates → Add WebSocket connections

### QUICK REFERENCE: When to Stop Scaling Discussion

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|---|
| ✓ You've addressed 3-4 major bottlenecks      |
| ✓ Interviewer signals to move on              |
| ✓ Less than 10 minutes remaining in interview |
| ✓ You've demonstrated systematic thinking     |