Technical Troubleshooting Guide

TECHNICAL TROUBLESHOOTING COMPREHENSIVE GUIDE

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ADVANCED TECHNICAL SUPPORT AND DIAGNOSTICS

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SYSTEM DIAGNOSTICS

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1 System Health Check

Problem: System performance degradation or instability

Diagnostic Steps:

Check system resource usage (CPU, RAM, Disk)

Review system logs for errors

Monitor network connectivity

Check database performance metrics

Verify service dependencies

Run system diagnostics tools

Tools Required:

• System monitoring dashboard

• Log analysis tools

• Performance profiling tools

• Network diagnostic utilities

Resolution:

Identify resource bottlenecks

Optimize resource allocation

Restart problematic services

Update system configurations

Scale resources if needed

Implement monitoring alerts

2 Memory Leaks

Problem: System memory usage continuously increases

Diagnostic Steps:

Monitor memory usage over time

Identify processes with high memory consumption

Check for memory leaks in applications

Review garbage collection logs

Analyze memory allocation patterns

Test with reduced load

Resolution:

Restart memory-intensive processes

Optimize application memory usage

Implement memory limits

Add memory monitoring

Update problematic applications

Consider memory scaling

3 CPU Bottlenecks

Problem: System CPU usage at 100% causing slowdowns

Diagnostic Steps:

Identify high-CPU processes

Check for infinite loops or deadlocks

Monitor CPU usage patterns

Review application performance

Check for resource contention

Analyze system calls

Resolution:

Optimize CPU-intensive operations

Implement process prioritization

Add CPU throttling

Scale CPU resources

Optimize algorithms

Add performance monitoring

NETWORK TROUBLESHOOTING

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1 Connectivity Issues

Problem: Intermittent network connectivity

Diagnostic Steps:

Check physical network connections

Test network interface status

Verify DNS resolution

Check routing tables

Monitor packet loss

Test with different networks

Tools:

• ping, traceroute, netstat

• Network monitoring tools

• Packet capture utilities

• Network diagnostic software

Resolution:

Replace faulty network hardware

Update network drivers

Configure network settings

Implement network redundancy

Add network monitoring

Contact network provider

2 Latency Problems

Problem: High network latency affecting performance

Diagnostic Steps:

Measure round-trip time (RTT)

Check network congestion

Identify latency sources

Monitor bandwidth usage

Check for packet loss

Analyze network topology

Resolution:

Optimize network routing

Implement QoS policies

Use CDN services

Optimize application protocols

Reduce network hops

Upgrade network infrastructure

3 Firewall and Security Issues

Problem: Network blocked by firewall or security policies

Diagnostic Steps:

Check firewall rules

Verify security group settings

Test port accessibility

Review security policies

Check for IP blocking

Verify authentication

Resolution:

Update firewall rules

Configure security groups

Open required ports

Update security policies

Whitelist IP addresses

Implement proper authentication

DATABASE ISSUES

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1 Connection Problems

Problem: Cannot connect to database

Diagnostic Steps:

Check database service status

Verify connection parameters

Test network connectivity

Check authentication credentials

Verify database permissions

Review connection limits

Resolution:

Restart database service

Update connection parameters

Fix network issues

Reset credentials

Grant proper permissions

Increase connection limits

2 Performance Issues

Problem: Database queries running slowly

Diagnostic Steps:

Analyze query execution plans

Check database statistics

Monitor resource usage

Review indexing strategy

Check for locks and contention

Analyze slow query logs

Resolution:

Optimize slow queries

Update database statistics

Add proper indexes

Resolve lock contention

Optimize table structure

Implement query caching

3 Data Corruption

Problem: Database data appears corrupted

Diagnostic Steps:

Check database integrity

Review error logs

Verify backup integrity

Check for hardware issues

Analyze corruption patterns

Test data consistency

Resolution:

Restore from backup

Run database repairs

Fix hardware issues

Implement data validation

Add corruption detection

Improve backup procedures

API AND INTEGRATION PROBLEMS

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1 Authentication Failures

Problem: API authentication not working

Diagnostic Steps:

Verify API keys and tokens

Check authentication headers

Test with different credentials

Review authentication flow

Check token expiration

Verify API permissions

Resolution:

Regenerate API keys

Fix authentication headers

Update credentials

Implement proper auth flow

Handle token refresh

Grant proper permissions

2 Rate Limiting Issues

Problem: API requests being rate limited

Diagnostic Steps:

Check rate limit headers

Monitor request frequency

Review rate limit policies

Check for burst requests

Analyze usage patterns

Verify rate limit configuration

Resolution:

Implement request throttling

Add rate limit handling

Optimize request patterns

Use rate limit headers

Implement retry logic

Request limit increases

3 Integration Failures

Problem: Third-party integrations not working

Diagnostic Steps:

Check API endpoint status

Verify integration credentials

Test API connectivity

Review integration logs

Check data format compatibility

Verify webhook configurations

Resolution:

Update API endpoints

Refresh integration credentials

Fix connectivity issues

Implement proper error handling

Fix data format issues

Configure webhooks properly

PERFORMANCE OPTIMIZATION

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1 Application Performance

Problem: Application response times too slow

Diagnostic Steps:

Profile application code

Check database performance

Monitor external API calls

Review caching strategies

Analyze resource usage

Check for bottlenecks

Resolution:

Optimize slow code paths

Implement database optimization

Add API response caching

Improve caching strategies

Optimize resource usage

Implement performance monitoring

2 Caching Optimization

Problem: Caching not improving performance

Diagnostic Steps:

Check cache hit rates

Verify cache invalidation

Monitor cache performance

Review caching strategies

Check cache storage

Analyze cache patterns

Resolution:

Optimize cache keys

Implement proper invalidation

Add cache monitoring

Improve caching strategies

Optimize cache storage

Implement cache warming

3 Load Balancing

Problem: Load distribution not optimal

Diagnostic Steps:

Check load balancer configuration

Monitor server health

Review routing rules

Check session persistence

Monitor response times

Analyze traffic patterns

Resolution:

Update load balancer config

Fix unhealthy servers

Optimize routing rules

Configure session persistence

Implement health checks

Add load monitoring

ERROR CODE REFERENCE

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1 HTTP Status Codes

200: OK - Request successful

201: Created - Resource created

400: Bad Request - Invalid request

401: Unauthorized - Authentication required

403: Forbidden - Access denied

404: Not Found - Resource not found

429: Too Many Requests - Rate limited

500: Internal Server Error - Server error

502: Bad Gateway - Gateway error

503: Service Unavailable - Service down

2 Database Error Codes

Connection refused: Network or service issue

Authentication failed: Invalid credentials

Permission denied: Insufficient privileges

Table not found: Missing table or schema

Duplicate key: Unique constraint violation

Deadlock detected: Transaction conflict

Connection timeout: Network timeout

Query timeout: Query execution timeout

3 System Error Codes

EACCES: Permission denied

EADDRINUSE: Address already in use

ECONNREFUSED: Connection refused

ENOENT: No such file or directory

ENOMEM: Out of memory

ETIMEDOUT: Operation timed out

EIO: Input/output error

ENOSPC: No space left on device

RECOVERY PROCEDURES

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1 Service Recovery

Identify failed service

Check service status

Review error logs

Attempt service restart

Verify service health

Monitor for stability

2 Data Recovery

Assess data loss extent

Check backup availability

Verify backup integrity

Plan recovery strategy

Execute recovery process

Validate recovered data

3 System Recovery

Assess system damage

Check hardware status

Review system logs

Plan recovery approach

Execute recovery steps

Verify system functionality

MONITORING AND ALERTING

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• Implement comprehensive monitoring

• Set up alerting for critical issues

• Monitor system health metrics

• Track performance indicators

• Monitor error rates and patterns

• Implement automated recovery

PREVENTION STRATEGIES

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• Regular system maintenance

• Proactive monitoring

• Automated health checks

• Regular backup testing

• Performance optimization

• Security updates and patches

This technical guide should be used in conjunction with the main customer support knowledge base for comprehensive issue resolution.