Troubleshooting z/OS MVS System Dumps

Overview

This course provides an effective and systematic approach to z/OS problem diagnosis. Attendees learn to efficiently identify system problems in order to provide greater system availability. The course focuses on a debugging methodology using IPCS. Practical workshops provide an opportunity to learn to debug system problems in realistic situations. Dump analysis exercises SVC dumps to examine system data areas, the trace tables and LOGRECs in order to determine system status and condition at the time of the dump.

Audience

This course is designed for those individuals responsible for problem determination.

Pre-requisites

To benefit from this course, participants need both the ability to read Assembler code and familiarity with z/OS internal operations and data areas (including the concept of control block chaining). These prerequisites can be met by completing the courses 'Using z/OS Assembler', 'z/OS System Fundamentals Part 1' and 'z/OS System Fundamentals Part 2'.

Objective

- use the appropriate diagnostic procedure for each type of dump.
- identify the failing operating system component in standalone and SVC dumps
- use various operating system data-gathering facilities such as system traces, LOGREC, and SLIP.
- locate information in various manuals that is critical to problem resolution.

Key topics

Interactive Problem Control System

Control block/data area: Information sources; Control block header; Control block data area map; Cross reference table; Fields and subfields; Field redefinitions; Control block chaining; Finding control blocks; The Prefix Area (PSA); The new Prefix Area (PSA); Dump types; IPCS introduction: what is IPCS?, What makes up IPCS?; Getting started with IPCS - Primary Option Menu; Default values selection; Primary Option Menu; Data entry panel; Pointer stack panel; Getting around in IPCS browse;
IPCS subcommand entry panel; IPCS command output display; IPCS LIST command; Indirect addressing; Displaying Control Blocks; Creating SYMBOLS: Dump Directory; Additional Useful Commands; Dump analysis panel; Component Data Analysis Panel; STATUS; Analysis commands; Dump Management panel.

Recovery and Termination

MVS's recovery management; RMS; What does RTM do?; Interrupt types; Anatomy of an Interrupt; RTM - The Big Picture; How is RTM invoked?; Normal termination; Abnormal termination - problem types; Program check; Software 'Abend'; Abnormal termination - recovery; Recovery routines; RTM status information; ESPIE environment; ESPIE processing; ESTAE recovery routines; ESTAE environment; STAE Control Blocks (SCB); ESTAE processing; Percolation; Functional Recovery Routines; FRR environment; FRR stacks; RTM2WA; SDWA; Variable Recording Area; Interpreting the SDWA; Interpreting the Variable Recording Area; Logrec detail reports.

Request Block Analysis

Address space structures; RB loss of control; Linkage stacks; RB analysis procedure; Linkage Stack analysis; General analysis; RB analysis.

System Trace

Starting the System Trace; Formatting the Trace; Sequence of events; Interpreting the Trace; System Trace tips.

SVC Dump Analysis Approach

Generating SVC dumps; Dump Analysis and Elimination; Types of SVC Dump; Problem resolution overview; Dump TITLE; SDWA; History; RTM2WA; Other dumps.

Multi Processor Environments

Tightly coupled processing; Prefixing; Processor coexistence; Processor STATUS; Work In Progress; Interrupt information.

Locks

The problem; An example of what can go wrong; Serialization via LOCKS; Lock varieties; Locking Hierarchy; Locking Mechanics (SPIN); Spin Loop Identification; Spin Lock Holder; Local/CML Locks; Locking Mechanics; Global Suspend Locks ANALYZE; Locks Held; Locking Mechanics (CPU LOCK); SPIN lock summary; SUSPEND lock summary.

Dispatcher

What does it mean to be dispatched?; Where does the dispatcher run?; Dispatchable units of work; Who calls the Dispatcher?; Special exits; Service Request Block routines; Service Request Block (SRB); SRB example - IOS post; Service Request Block (SRB); Suspended Service Request Block (SSRB); SRB priorities; SRB scheduling with IEAMSCHD; SRB enclaves; Dispatcher queues; Scheduling service requests; Address spaces; ASCB/ASXB contents; Finding work within an address...
space - tasks; TCB contents; TCB chaining; Address space task structure; Serialization with Intersect; Dispatcher indicators; Global problem determination; Global indicators - SRB queues.

**Consoles and Master Trace**

Message generation; Console structure; Messages; Message Queue problems before SADump; Message queue problems after SADump; Action Messages; Master Trace; Interpreting the Master Trace; Console Component Analysis.

**Input/Output Supervisor**

IOS drivers; Performing I/O; I/O flow; IOS analysis - high level; Active I/O analysis; IOS failure analysis.

**Real Storage Manager**

Types of storage; Dynamic Address Translation; Identifying The STD; Managing real storage; RSM high level check; Detailed analysis - high fixed page utilisation; Detailed analysis - other problems; History - Component Trace.

**Auxiliary Storage Manager**

Paging a frame to a slot; ASM high level check; Detailed analysis: what is the problem?; who is affected?

**SAD Analysis Approach**

Big picture; Dump environments; When should A SADUMP be taken?; Pre SADUMP considerations; Taking a Standalone Dump; Stand Alone Dump analysis path selection; Disabled Wait analysis path; Enabled Wait Analysis path; Enabled Running Analysis path; Disabled Running Analysis path.