



Capturing DSN Software Error Messages
to Improve Software, Operations and
Data Delivery

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Operations et

- Greater than 30% of DSN data outages are due to software problems
 - In reality more if “unknown” cause taken into account – non-real time analysis shows most unknowns are more likely SW related.
 - By their nature, they are elusive.
 - The SW is becoming more complex to meet higher data demands.
 - The variety of descriptions of problems from 4 DSN sites (2 in US, Australia & Spain) does not help.

- **Description inconsistency**
 - Minimum of 3 languages, plus idiom.
 - Variance in skill & experience levels.
 - Occasional instances of hesitancy in accounting with veracity.

- **SW error messages not as useful as they could be**
 - Unable or difficult to identify the root cause.
 - Older systems have poor error message routines.
 - No time to search huge log files.

- **Result - investigation is hampered**
 - If the developers cannot identify the cause, they cannot correct it.
 - Investigation difficulty encourages superficial analysis.
 - Neither developers nor user community learns and improves.
 - The software fix or design change is delayed.
 - Data continues to be lost.

- Initial error capture was a manual process
 - Requested observers to select the “first” error message.
 - Observers often did not enter the information. They had to “hunt” the Log.
 - No real trends were able to be established due to the unreliability of data entered.
 - Those systems have now been phased out.

- One solution – capture the error messages more efficiently
 - Many older systems not suitable due to inefficient error routines.
 - Recent systems much better.
 - More recent improvements with storage capacity also assists.
- To capture efficiently – must be as automated as possible.

□ Automated Capture

- We require the link operator to:
 - Designate a start and end time.
 - Dominate a system or systems whose messages we wish to collect
- The script then parses the log file extracting ONLY the relevant error messages within that period.
- Error listing will reduce the call for the full Log in many instances.

□ Script Capture

- Makes use of the format of the text Log file to identify the lines of interest.
- The set format of the Log file makes this extraction task a simpler one.
- Capture log entries for the system, all warnings, operator & automation directives and responses within the time frame.

Microsoft Photo Editor - Logsmudge.jpg

File Edit View Image Effects Tools Window Help

100%

1	00:34:44	PA	con1-ce	con1-ce	6110	Opened connection log file: 040040034.L01.4325400209
2	00:34:44	EQ	con1-ce	con1-ce	279	Program ID of SCP2 now GSH-5599-OP-B V2.0.4
3	00:34:45	EQ	con1-ce	con1-ce	279	Program ID of UG43 now DBU-5529-OP-C 3.0.6
4	00:34:46	EQ	con1-ce	con1-ce	279	Program ID of XH43 now DFX-5244-OP-2.03
5	00:34:46	EQ	con1-ce	con1-ce	33	Equipment: SCP2 UG43 AP1 XH43 U43 DCO2 V1A V2A
6	00:34:49	LO	U43	con1-ce/U43	6001	UPL is UPL-6167-OP DV4.1.1, Build 4.1.1 of Aug 7 2003 09:31:1
7	00:34:50	EQ	con1-ce	con1-ce	279	Program ID of DCO2 now DTT-6090-OPD
8	00:34:50	EQ	con1-ce	con1-ce	279	Program ID of V2A now DVS-6130-OP
9	00:34:50	EQ	con1-ce	con1-ce	279	Program ID of U43 now UPL-6167-OP
10	00:34:52	PA	DCO2	con1-ce/DCO2	3404	REC1 BOOT TIME: 352 18:43:16
11	00:34:52	PA	DCO2	con1-ce/DCO2	1418	RRP2 BOOT TIME: 365 19:51:52
12	00:34:52	LO	DCO2	con1-ce/DCO2	3601	NAME:mer2.scap CREATED=02/219 08:13:46 MOD_NSS=03/311 09:58:35
13	00:34:52	W!	DCO2	con1-ce/DCO2	3175	S/C Capabilities File: Unknown variable: TRB_PN_DECODE
14	00:34:52	W!	DCO2	con1-ce/DCO2	3175	S/C Capabilities File: Unknown variable: TRB_CRC_CHECK
15	00:34:52	LO	DCO2	con1-ce/DCO2	3600	NAME:mer2.scap ORIG:mer2.scap
16	00:34:52	LO	DCO2	con1-ce/DCO2	3600	NAME:mer2.scap RCVD:2003/317/05:43:09
17	00:34:52	PA	DCO2	con1-ce/DCO2	3409	SPACECRAFT FILE LOADED. NAME:mer2.scap
18	00:34:53	LO	DCO2	con1-ce/DCO2	3601	NAME:70254hr.cfg CREATED=02/219 08:20:55 MOD_NSS=03/321 14:48:
19	00:34:53	LO	DCO2	con1-ce/DCO2	3600	NAME:70254hr.cfg ORIG:70254hr.cfg
20	00:34:53	LO	DCO2	con1-ce/DCO2	3600	NAME:70254hr.cfg RCVD:2003/321/22:39:31
21	00:34:53	LO	DCO2	con1-ce/DCO2	3604	Configured DCC for SCN 254 Mission 26 Bands X-up X-dn
22	00:34:53	W!	DCO2	con1-ce/DCO2	2101	MISMATCHED CNF: RNG UGC POL U BUT RCV UGC POL L. Accepting RCV
23	00:34:53	W!	DCO2	con1-ce/DCO2	3151	Range predicts data has not been loaded - Uplink Acq start tti
24	00:34:54	LO	DCO2	con1-ce/DCO2	2600	UPL Rng Data Gap: Rng phase 55552316.959338 time 000001. Last
25	00:34:54	LO	DCO2	con1-ce/DCO2	2600	Using RNG XNIT from UPL: DOY 4 time 000000
26	00:34:54	W!	DCO2	con1-ce/DCO2	1125	Pc and Pt Inconsistent - Using Pt
27	00:34:54	LO	DCO2	con1-ce/DCO2	2602	New RTLT from predicts is 004319 or 2598.680 seconds
28	00:34:54	PA	DCO2	con1-ce/DCO2	1420	NPX TRK PREDICTS ARE SELECTED.
29	00:34:54	PA	DCO2	con1-ce/DCO2	1419	TLM PDX PREDICTS ARE TURNED OFF.
30	00:34:54	PA	DCO2	con1-ce/DCO2	1401	RCV/TLM CFG FILE IS LOADED. NAME:70254hr
31	00:34:56	EQ	con1-ce	con1-ce	279	Program ID of U43 now UPL-6167-OP
32	00:34:57	EQ	con1-ce	con1-ce	279	Program ID of DCO2 now DTT-6090-OPD
33	00:34:57	EQ	con1-ce	con1-ce	279	Program ID of V1A now DVS-6130-OP
34	00:34:58	EQ	con1-ce	con1-ce	279	Program ID of V2A now DVS-6130-OP
35	00:34:58	LO	DCO2	con1-ce/DCO2	1601	DDM: config file successfully loaded with status = 0
36	00:34:58	LO	DCO2	con1-ce/DCO2	1601	DDH: config file load. tick count = 16574215, complete flag =

Done Internet

Smudge (50%) Brush Size 20

LogError.txt - Notepad					
File	Edit	Format	View	Help	
1159	17:38:38	W!	U34	con3-ce/U34	20460 (T20K) WARNING. HEAT EXCHANGER SERVICE REQUESTED.
1232	17:50:31	DR	U34	cdscc/nmc-ws3	75 Processing. ETX is processing DRV OD.
1233	17:50:32	DR	U34	cdscc/nmc-ws3	75 Completed. DRV
1234	17:50:32	CA	U34	con3-ce/U34	20003 DRV
1235	17:50:33	CA	U34	con3-ce/U34	20403 COMPLETED. EXC DRIVE IS ON
1236	17:50:34	C!	U34	con3-ce/U34	20303 (T20K) TXR IS MODULATABLE.
1237	17:50:34	CA	U34	con3-ce/U34	20336 (T20K) TARGET_PWR=1.000 kW, ACTUAL_PWR=1.067 kW.
1253	17:50:57	PA	U34	con3-ce/U34	20043 LAST RAMP EXECUTED
1290	17:51:59	AD	cdscc/nmc-ws3	dss34-ulc	98 U34 CMD E
1291	17:51:59	DR	U34	cdscc/nmc-ws3	98 Processing. ETX is processing CMD OD.
1293	17:52:00	DR	U34	cdscc/nmc-ws3	98 Completed. CMD
1294	17:52:00	CA	U34	con3-ce/U34	20402 COMPLETED. COMMAND MOD 1
1302	17:52:30	TD	cdscc/nmc-ws3	dss34-ulc	48 U34 RNG E
1303	17:52:31	DR	U34	cdscc/nmc-ws3	48 Processing. RNG is processing RNG OD.
1304	17:52:32	DR	U34	cdscc/nmc-ws3	48 Processing. ETX is processing MOD RNG OD.
1305	17:52:33	DR	U34	cdscc/nmc-ws3	48 Completed. RNG
1306	17:52:33	CA	U34	con3-ce/U34	20405 COMPLETED. RANGE MOD 2
1308	17:52:49	W!	U34	con3-ce/U34	12406 Throughput block rejected: CMG / TXR / EXC not ready to radiate
1319	17:53:18	W!	U34	con3-ce/U34	12406 Throughput block rejected: CMG / TXR / EXC not ready to radiate
1320	17:53:39	W!	U34	con3-ce/U34	20460 (T20K) WARNING. HEAT EXCHANGER SERVICE REQUESTED.
1329	17:54:20	W!	U34	con3-ce/U34	12406 Throughput block rejected: CMG / TXR / EXC not ready to radiate
1330	17:54:32	W!	U34	con3-ce/U34	12406 Throughput block rejected: CMG / TXR / EXC not ready to radiate
1332	17:54:56	OD	cdscc/nmc-ws3	dss34-ulc	7 u d stscmd 24
1333	17:54:56	DR	U34	cdscc/nmc-ws3	7 Processing. sending request to workstation cdscc/nmc-ws3
1334	17:54:57	DR	U34	cdscc/nmc-ws3	7 Completed. display started on workstation cdscc/nmc-ws3
1345	17:55:01	W!	U34	con3-ce/U34	12406 Throughput block rejected: CMG / TXR / EXC not ready to radiate
1346	17:55:15	W!	U34	con3-ce/U34	12406 Throughput block rejected: CMG / TXR / EXC not ready to radiate
1348	17:55:44	W!	U34	con3-ce/U34	12406 Throughput block rejected: CMG / TXR / EXC not ready to radiate
1350	17:56:08	OD	cdscc/nmc-ws3	dss34-ulc	13 u cmd d
1351	17:56:08	DR	U34	cdscc/nmc-ws3	13 Processing. ETX is processing cmd OD.
1352	17:56:08	DR	U34	cdscc/nmc-ws3	13 Completed. CMD
1353	17:56:09	CA	U34	con3-ce/U34	20402 COMPLETED. COMMAND MOD OFF
1354	17:56:16	W!	U34	con3-ce/U34	12406 Throughput block rejected: CMG / TXR / EXC not ready to radiate
1357	17:56:46	W!	U34	con3-ce/U34	12406 Throughput block rejected: CMG / TXR / EXC not ready to radiate
1358	17:56:51	OD	cdscc/nmc-ws3	dss34-ulc	14 u maint cmd e
1359	17:56:51	DR	U34	cdscc/nmc-ws3	14 Completed. Send MAINT CMD again within 30 seconds
1360	17:56:55	OD	cdscc/nmc-ws3	dss34-ulc	15 u maint cmd e
1361	17:56:55	DR	U34	cdscc/nmc-ws3	15 Started. Enabling maintenance mode for CMD.
1370	17:57:12	PA	con3-block2870	con3-ce	2 Uplink ranging transmission detected.
1371	17:57:14	AD	cdscc/nmc-ws3	con3-ce	18 A184900 U34 MOD RNG D
1373	17:57:27	OD	cdscc/nmc-ws3	dss34-ulc	19 u boot cmd
1374	17:57:27	DR	U34	cdscc/nmc-ws3	19 Completed. Send BOOT CMD again within 30 seconds
1375	17:57:30	OD	cdscc/nmc-ws3	dss34-ulc	20 u boot cmd
1376	17:57:31	DR	U34	cdscc/nmc-ws3	20 Processing. CMD is processing boot OD.
1381	17:57:35	DR	U34	cdscc/nmc-ws3	20 Processing. CMD is processing boot OD.
1383	17:57:39	DR	U34	cdscc/nmc-ws3	20 Processing. CMD is processing boot OD.
1384	17:57:43	DR	U34	cdscc/nmc-ws3	20 Processing. CMD is processing boot OD.
1385	17:57:47	DR	U34	cdscc/nmc-ws3	20 Processing. CMD is processing boot OD.
1386	17:57:51	DR	U34	cdscc/nmc-ws3	20 Processing. CMD is processing boot OD.
1387	17:57:55	DR	U34	cdscc/nmc-ws3	20 Processing. CMD is processing boot OD.
1389	17:57:59	DR	U34	cdscc/nmc-ws3	20 Processing. CMD is processing boot OD.
1390	17:58:00	DR	U34	cdscc/nmc-ws3	20 Rejected. CMG is not operational.

- Other useful – data can help
 - Pass Catalogs – details of predicts, sequences etc. Collected and truncated into a stable format text file.
 - More recently the Link Operators checklist has evolved into a new electronic format, that can be collated with the pass catalogue.



Need to *INSERT* sample screen shots of the *Electronic Checklist*

the Link upon

should display

where error messages

- To make the data more useful it must be able to be retrieved
 - The DSN Discrepancy Reporting Management system (DRMS) is the vehicle.
 - Database of incidents, data outages and equipment issues across the DSN.
 - DRMS has included pass catalogues and Log URLs for some time.
 - DRMS revised to include suitable fields to retain the error data.

- The retrieved data must be “more” useful.
 - The attached Pass Catalogues are only available at the originating site.
 - The Log URLs also worked for sites, but needed revision at JPL.
 - The Log had everything – not just what was needed. Harder to make use of the data.
- How - add the text directly into the database.

- **Newer DRMS Error Data fields.**
 - Includes a text field for the parsed out messages to be copied into.
 - Allows the analysts to select one of the error messages as the prime message and to record:
 - The error number (Unique)
 - The error message text (parameters)

□ DRMS Error Querying.

- Full query capability provided to permit users to identify:
 - Trends that may be apparent in error messages.
 - Common, repeated messages in a variety of scenarios.
 - Repeated “parameters” within a given error message.

- DSS43 the 70M dish at Canberra, DSS46 in the background.
- Thank you for your attendance.
- Any questions?

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