



## **How to achieve zero defect of backup in SCE**

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Installation Code SCE**



## ***Manager's questions***

- **Do you complete all the backups as schedule?**
- **Does every client need to be backed up complete its backup?**
- **Do you backup a lot of useless data?**
- **Is the TSM server having enough tapes to complete the backup tonight?**
- **Do you know which client is not running properly?**
- **Have TSM servers been overloaded?**
- **How much effort do you need to spend to get the above information?**

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## Efforts

- **To achieve zero defects in backup, we had to monitor backup from TSM server and TSM client initially.**
- **To achieve the long term success of backup, we need to monitor the following TSM resources: TSM server tasks, TSM library, Storage Pool, Network adapter.**
- **To solve the problem efficiently, we had implemented monitoring the adapter workload, session report, and automatic reboot.**

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## Southern California Edison



- **4.3 Million Customers**
- **10 Million People In Service Area**
- **50,000 Square Mile Service Territory**
- **Over 11.4 Billion in 2001 Revenue**
- **Second-Largest Investor Owned Electric Utility In U.S.**
- **14,000 Employees**

\*\* Excluding

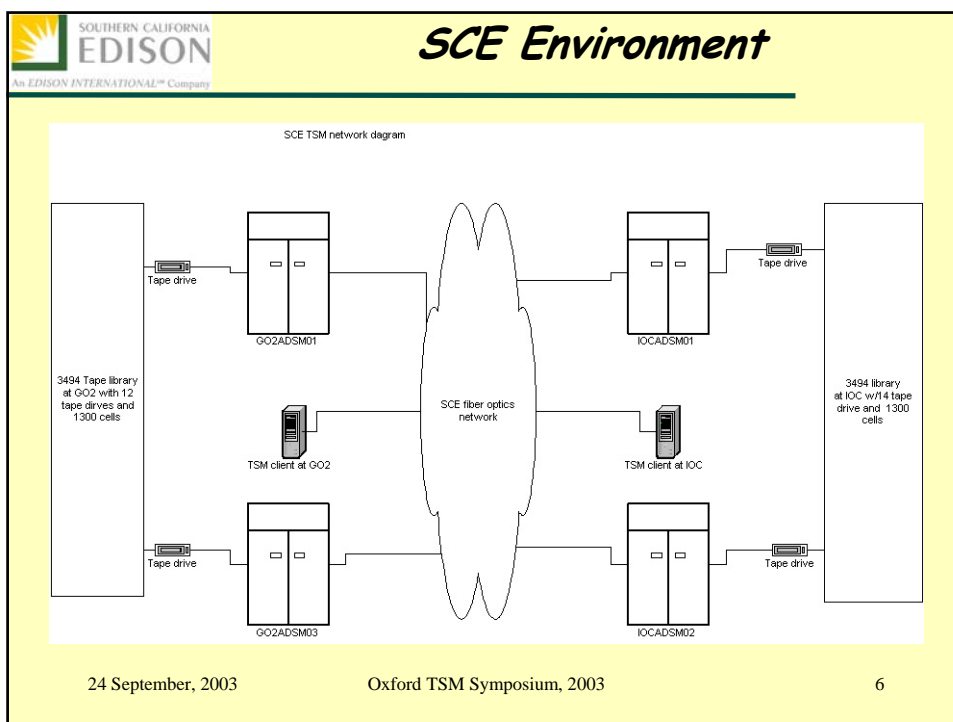
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## *SCE environment*

- **Estimated 5 % of servers retired and added on a monthly basis.**
- **Fast changing environment**
- **HACMP implemented on 30 % of servers**
- **Mixed IBM (90 %), SUN (9 %), HP & DEC (1%) in UNIX machines.**
- **Windows world with NT4, NT2000**
- **Perform DR backup always.**

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## SCE Environment


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• Server_name	Total - HAVE	Total - used	UNIX	DOM/NT	ORACLE	Sleeping
• GO2ADSM01	141	116	97	1	18	17
• GO2ADSM03	41	43	0	43	0	5
• IOCADSM01	136	134	71	61	2	22
• IOCADSM02	121	122	86	8	28	8
•						
• Out-Side-Fw						
• GO2ADSM02	29	21	14	7	0	2
• IOCADSM03	21	11	11	0	0	9
•						
• Total	489	447	279	120	48	63

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7



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## Monitor backup from TSM server


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- All administrative schedules ran OK ...
- No ERROR messages in Activity log ...
- No SEVERE messages in Activity log ...
- #####
- Activity log WARNING messages
- #####
- Tivoli Storage Manager
- Command Line Administrative Interface - Version 5, Release 1, Level 6.0
- (C) Copyright IBM Corporation 1990, 2003 All Rights Reserved.
- Session established with server GO2ADSM02: AIX-RS/6000
- Server Version 5, Release 2, Level 0.1
- Server date/time: 08/22/03 06:02:02 Last access: 08/22/03 06:00:01
- Date/Time Message
- -----
- ANS8002I Highest return code was 0.
- #####
- #####
- ##### Hardware class Error log entries #####
- #####
- #####

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8



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## Monitor backup from TSM server

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- #####
- **These are the exceptions for backup/archive schedules**
- #####
- **Tivoli Storage Manager**
- **Command Line Administrative Interface - Version 5, Release 1, Level 5.0**
- **(C) Copyright IBM Corporation 1990, 2002 All Rights Reserved.**
  
- **Session established with server GO2ADSM03: AIX-RS/6000**
- **Server Version 5, Release 2, Level 0.1**
- **Server date/time: 08/22/03 06:00:00 Last access: 08/22/03 05:57:01**
  
- **ANS8000I Server command: 'q ev \*\* t=c begin=today-1 end=today begin=06:00 end=06:00 ex=yes'**
  


Scheduled Start	Actual Start	Schedule Name	Node Name	Status
-----	-----	-----	-----	-----
08/21/03 13:45:00		NT_DAILY_INC02T	GO2NTLDAPP01	Missed

  
- **ANS8002I Highest return code was 0.**

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9



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## Monitor backup from TSM client


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- **Plan to report of 9 nodes**
- **Success node is 9**
- **Failure node is 0**
- **Ping failed node is 0**
  
- #####
- **DOMINO backup result of go2iapp01**
- #####
- **go2iapp01 DOMINO incremental backup on 08/21/03 20:01 is successful**
  
- **Total Domino databases inspected: 227**
- **Total Domino databases backed up: 1**
- **Total Domino databases excluded: 0**
- **Total Domino backup objects expired: 0**
  
- **Throughput rate: 15.15 Kb/Sec**
- **Total bytes transferred: 1,225,728**
- **Elapsed processing time: 79.01 Secs**

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10




## Monitor backup from TSM client

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- **ADSM IBM Backup suspected problem nodes on Tue Feb 18 08:37:55 PST 2003**
- \*\*\*\*\*
- \* \* \*
- \* **Nodes backup longer than one hour** \* \*
- \* \* \*
- \*\*\*\*\*
- carson2 Elapsed processing time: 01:25:12; Network data transfer rate: 1,121.07 KB/sec
- go2fss01lastby Elapsed processing time: 01:24:02; Network data transfer rate: 1,380.26 KB/sec
- go2perf01 Elapsed processing time: 05:52:15; Network data transfer rate: 1,399.52 KB/sec
- iocoltp04bstby Elapsed processing time: 01:02:41; Network data transfer rate: 1,049.18 KB/sec
- ioctmr01 Elapsed processing time: 01:07:20; Network data transfer rate: 850.56 KB/sec
- \*\*\*\*\*
- \* \* \*
- \* **Nodes backup longer than 30 minutes** \* \*
- \* \* \*
- \*\*\*\*\*
- go2cds01 Elapsed processing time: 00:59:49; Network data transfer rate: 1,946.81 KB/sec
- go2fil01 Elapsed processing time: 00:35:00; Network data transfer rate: 1,695.23 KB/sec
- go2fss03 Elapsed processing time: 00:52:57; Network data transfer rate: 1,067.17 KB/sec
- go2iapp01 Elapsed processing time: 00:34:21; Network data transfer rate: 876.96 KB/sec
- go2iapp05 Elapsed processing time: 00:35:30; Network data transfer rate: 1,110.64 KB/sec
- go2ibs03a Elapsed processing time: 00:31:48; Network data transfer rate: 1,163.06 KB/sec
- go2l2s1 Elapsed processing time: 00:57:47; Network data transfer rate: 1,665.66 KB/sec
- iocdisp01 Elapsed processing time: 00:50:45; Network data transfer rate: 864.53 KB/sec

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11




## Observe TSM resources

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- \*\*\*\*\*
- **iocadm02 network adapter backup of MB and tape drive % report on Tue Feb 18 07:15:00 PST 2003**
- \*\*\*\*\*

date/time	at0	at1	at2	at3	en0	sum	tapdrv%
021703 19	14931	11652	4280	6361	0	37224	82%
021703 20	14611	11793	5149	4390	1	35944	90%
021703 21	13885	11381	6429	1904	0	33599	82%
021703 22	12079	13759	5538	6807	1	38184	78%
021703 23	18598	13634	3895	2050	0	38177	80%
021803 00	11255	8314	4254	11432	1	35256	71%
021803 01	14780	6098	3878	6781	0	31537	64%
021803 02	12209	6452	7496	10094	0	36251	68%
021803 03	13848	10173	8223	4001	1	36246	63%
021803 04	20571	3357	8411	135	0	32474	53%
021803 05	21321	302	7105	68	1	28797	32%
021803 06	16802	4141	9057	67	0	30067	41%

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12




## Observe TSM resources

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- \*\*\*\*\*
- **go2adsm01 session report; report on Tue Feb 18 07:03:00 PST 2003**
- \*\*\*\*\*

date/time	Session name
• 021703 19	ESM01.ORA_12 IOCTMR01O.ORA_12 IOCWMSP01.ORA_12 IOCCDS01.ORA_11 IOCITSC15.ORA_11 IOCNS03_11 IOCOLTP05.ORA_11 IOCOLTP04.ORA_10 IOCMRS03.ORA_7 IOCITSC01B_6 DCMS01_3 IOCNGW06_3 IOCL6S1_2
• 021703 20	ESM01.ORA_12 IOCOLTP04.ORA_12 IOCOLTP05.ORA_12 IOCTMR01O.ORA_12 GO2EPP01.ORA_11 IOCITSC15.ORA_11 IOCOLTP03.ORA_11 IOCOLTP04B_11 IOCOLTP07.ORA_11 IOCWMSP01.ORA_11 IOCITSC01.ORA_9 IOCTMR01_3
• 021703 21	ESM01.ORA_12 IOCITSC01.ORA_12 IOCOLTP03.ORA_12 IOCOLTP04.ORA_12 IOCOLTP05.ORA_12 IOCTMR01O.ORA_12 IOCWMSP01.ORA_12 IOCITSC15.ORA_11 IOCTMR01_4 IOCOLTP03B_3
• 021703 22	ESM01.ORA_12 IOCOLTP03.ORA_12 IOCOLTP04.ORA_12 IOCOLTP05.ORA_12 IOCTMR01O.ORA_12 IOCWMSP01.ORA_12 IOCITSC01.ORA_10 DCMS01_3 IOCOLTP03B_3 IOCMRS03B_2 IOCNGW05_2

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13



## Observe TSM resources

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- **Baseline report on Tue Feb 18 06:05:14 PST 2003 for go2adsm01**
- =====


- **Registered Client Nodes is 116; Licensed Client Nodes is 141**
- **Oracle client is 18 ; Domino node is 1 ; NT node is 0 ; Sleeping node is 17 ; UNIX node is 97**

- **Data base size is 15,200 MB; Data base usage is 27.0 % with max of 27.1 %**
- **Data Base Log size is 800 MB; Data Base Log Usage is 0.1 % with max of 4.4 %**

- **Total Disk space is 47400 MB**
- **UNIX disk migration happened 2 times**
- **Data base disk migration happened 2 times**

- **Total tapes in use is 402 ; Scratch tape available is 432**
- **number of cells.....1325**
- **available cells.....97**
- **bulk input empty cells.....0**
- **bulk output empty cells....0**
- **avail 3590 cleaner cycles..72**

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14




## Observe TSM resources

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- #####
- ORACLE backup usage of iocadsm02 on Thu Feb 20 04:01:30 PST 2003
- #####
- AIXINDERPAL.ORA has backup of 40 days of 1474 MB data stored on ADSM
- GO2CDS01.ORA has backup of 24 days of 886351 MB data stored on ADSM
- GO2ESM02.1.ORA has backup of 143 days of 436277 MB data stored on ADSM
- GO2ESM02.ORA has backup of 19 days of 1730353 MB data stored on ADSM
- GO2FSS01.ORA has backup of 16 days of 4766 MB data stored on ADSM
- GO2FSS02.ORA has backup of 33 days of 400780 MB data stored on ADSM
- GO2L2P1.ORA has backup of 76 days of 54582 MB data stored on ADSM
- GO2L2S1.ORA has backup of 30 days of 248482 MB data stored on ADSM
- GO2MDMA01.ORA has backup of 17 days of 7240 MB data stored on ADSM
- GO2MRS03.ORA has backup of 78 days of 112619 MB data stored on ADSM
- GO2OLTP08.ORA has backup of 17 days of 37848 MB data stored on ADSM
- GO2OLTP09.ORA has backup of 21 days of 400288 MB data stored on ADSM
- GO2RGT01.ORA has backup of 81 days of 95731 MB data stored on ADSM
- GO2RGT05.ORA has backup of 52 days of 181055 MB data stored on ADSM
- IOCL6S1\_1.ORA has backup of 23 days of 217825 MB data stored on ADSM

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15




## Detect TSM errors

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- **ATM adapter not responds to PING (every 5 minutes).**
- **Dying of dsmserv tasks (every 15 minutes)**
- **Tape drives go off line (every 30 minutes)**
- **Robot ARM got stuck and other tape drive errors (every hour)**
- **Check dsmserv function (every hour)**
- **Lost TSM mirror database or log space (every hour)**
- **Too many sessions self recovery (every 5 minutes)**
- **Central scheduler failure self recovery (every hour)**

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16






**Other proactive measures**

- **Use delete file system script to delete each file system in foreground to prevent possible database crash.**
- **Check archive file space to prevent accidentally delete long term archive when retiring a node.**
- **Script to check TSM server prevents duplicate nodes.**
- **Disable hourly archive during the backup window to prevent tape drive contention.**
- **Automatic reboot TSM servers on a weekly basis to get a fresh start.**

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