DaPlan
Ethernet-Side Data Gathering
Sunday 12-04-2005

OVERVIEW

This document itemizes the steps which we will take on Sunday 12-04-2005 to gather data about the 'clients experience slow performance wrt to Indigo when SDS performs database backups' issue.

Outline

Basically, we will initiate the pathology using Uncle Stewart's Tidal jobs and then perform four separate 'data captures': sniffing at a client, sniffing at the server, dumping port counters from j4sr-a-esx:6/47 (the port to which Indigo attaches), and watching real-time graphs of various counters on j4sr-a-esx and on Indigo.

Do we need four separate data sets? Probably not. But Stuart predicts that we'll run into glitches and potholes along the way, invaliding one or more of the data sets. Four feels like a reasonable shot at getting at least one pure data set.

Caveats

- We will likely run into potholes as we go and then deviate from DaPlan. When this happens, I know that I will feel distressed. But that's part of life.
- I recommend using headphones for the conference call -- reduces the background noise. However, speaker phones will work
  .

Assumptions

- bluearc-x-av are disabled
- Running the Tidal jobs will re-create the problem

Outstanding Issues

- Add in-line sniffer laptop to domain
- Install in-line sniffer, test filters
- Show Rick Surveyor
- Show Robert WUG
- Show Ana Ethereal

Scope of Work

IN SCOPE

During set-up, we will disable Indigo's second NIC and insert an in-line sniffer on Indigo's surviving NIC. We will replicate the problem, using test routines which Uncle Stewart has provided, and then capture data on various components using various tools. We will store this data in the project directory tree. At the end, we re-enable the second NIC and remove the in-line sniffer.

OUT OF SCOPE

We will not change the production environment. We recognize that doing this may be tempting, particularly if we discover what we believe to be the cause of a problem … but we resolve to resist this temptation and to pass proposed changes through the usual change control process next week instead.

SUMMARY

We will put everything back the way we found it.

WHO

Owner

Stuart Kendrick owns the event.

Team

The on-site team consists of:

Person	Role	Location
Rick Bawaan	Indigo Sniffer	His office
Ana Dos Santos	Client Operator	Her office
Pat Hirayama	Switch Operator	His office
Stuart Kendrick	MC	His office
Robert McDermott	Real-Time Watcher	His office
Sonja Outlaw	Management Support	Float
Susan Way	Tidal Monitor	Her office

The off-site team consists of:

Person	Role	Location
Stewart Castaldi	Consultant	Home

If you don't like your role, think you'd be better suited for another role, etc., please speak up … I'm not trying to dictate here, just trying to keep the ball moving along at a decent clip.

Roles

From a high level, Client Operator and Indigo Sniffer dance, syncing with one another, while Switch Operator shadows their every move. All three capture data from their three perspectives, saving it in a coherent manner. Tidal Monitor is in charge of keeping the pathology going (i.e. keeping the pipe from SDS servers to Indigo full). MC calls the steps. And Real-Time Watcher

dances his/her own dance, aware of the activities of Tidal Monitor, but otherwise decoupled from what everyone else is doing.

I prefer using text files to record comments. However, if you prefer to use Microsoft Word or WordPad or whatever, please feel free.

I would like Client Operator, Indigo Sniffer, and Switch Operator to name their data files (traces and text files) using the same naming convention, namely their role name followed by a time stamp which the MC will call out at the end of a dance routine. See the role descriptions for details.

TIDAL MONITOR

Overview

This is the person who manages the SDS procedures which we believe will degrade client/Indigo performance. This person's chief function is to launch Tidal jobs as needed, to remove the resulting files on Indigo as needed, and to report to the MC on the state of Tidal jobs as needed.

Details

This person saves start/stop times for various jobs in a text file located in the 'Tidal' directory. See the example 'Tidal-Record.txt' file.

I'm imagining that this person will perform other data gathering tasks … perhaps watching parameters on Indigo using BlueArc-specific tools (watching the event log, perhaps). Perhaps running a 'tail –f grep indigo' on syslog. If Indigo logs a critical error message during this event, this person owns the task of investigating it, freeing up the rest of the team to continue their work. Please save any data you gather – log extracts, for instance – to the appropriate directory (Indigo perhaps, or Tidal, as you see fit).[1]

This person communicates with the MC, ensuring that the MC knows the current state of the Tidal jobs. In general, this person will be 'keeping the pipe full', i.e. if a Tidal job completes, then s/he will likely launch another job. (Or perhaps re-launch a past job, taking care to erase the target file before doing so.)

Directory

\\admshared\it\vdops\projects\BlueHeat\Data\2005-12-04\Tidal

Preparation
- Verify that the target directory on Indigo is empty (because robocopy won't overwrite a file if it exists and is complete).
- Practice initiating a Tidal job and verifying that the file lands where you expect it to land.

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[1] If we had another body, I would split out these tasks into a dedicated 'Indigo Monitor' role. As it is, I'm trying to glue two roles together.

- Verify that you have Uncle Stewart's home number available, in case you need to consult.

CLIENT OPERATOR

Overview

This person will run the client (any Windows box) along with Sniffer One (a Windows or Unix box with Ethereal installed on it). This person's primary function is to capture client-side packet traces at various points during the evening.

Details

The Client plugs into a mini-hub (must be a hub, not a switch, borrow Stuart's NetGear mini-hub if you aren't sure). Sniffer One plugs into the mini-hub. The mini-hub plugs into the wall (and from there to j4-esx). Please verify that you are running the latest version of Ethereal: .10.13 (see \\sluf22\vdops\utilities\network-analysis\Ethereal). Also, please make sure that Sniffer One is a *faster* machine than the Client. In particular, if the Client is using an Ethernet NIC integrated onto the motherboard or installed in a PCI slot, do *not* use a laptop equipped with a CardBus NIC for Sniffer Two. I want Sniffer One to be able to capture packets off the wire *faster* than the Client can emit them … and I believe that integrated Ethernet NICs and PCI NICs can outpace a CardBus NIC. Employ a capture filter on the MAC address of the client. Please simplify the client as much as possible: i.e. close all programs except for the command prompt, unmap all drives except for the one mapping to Indigo, etc. Do the same for Sniffer One. I recommend having a third box around so that you can perform "other tasks", like reading e-mail and working with a browser, etc.

The Client will copy a ten megabyte file from Indigo to itself and back again, using a DOS window and the 'copy' command:

```
c:\temp> timethis copy test-file.jnk h:\
```

Please save Ethereal files in ENC format (aka DOS-Sniffer format), with a ".enc" extension (you have to add the .enc extension yourself; Ethereal won't do it for you, even when you select 'DOS-Sniffer Format').

Trace Naming Convention:
Client-{timestamp}.enc
e.g. client-2015.enc

Directory

After each test, this person will save the trace file to \\sluf22\BlueHeat\Data\2005-12-04\Client This person will also maintain a text file describing the traces (see 'Client-Traces.txt' in this directory) and recording the time it took to copy test-file.jnk.

Preparation
- ▪ Create a precise ten megabyte test file (use the creatfil.exe command from the Windows resource kit). Perform a 'dir' command and record the precise size of the file in bytes in your 'Client-Traces.txt' file.
- ▪ Verify that you have the "timethis.exe" program from the Windows resource kit
- ▪ Copy it from Indigo to the client PC five times and record how long it takes each time.
- ▪ Copy it from the client PC to Indigo five times and record how long it takes each time.
- ▪ Record the results in the 'Client' directory in the 'Client-Traces.txt' file.
- ▪ Practice configuring Ethereal to capture only on the client. Verify that this works by emitting Pings from the client to, say, spot, then stopping the capture and looking for the pings. You should see very little other than the Pings in the trace.
- ▪ Coordinate with Indigo Sniffer to capture a baseline trace prior to 8:00pm.

INDIGO SNIFFER

Overview

This person will operate Sniffer Two, which will be placed in-line with Indigo. This person's chief function will be to capture packet traces from Indigo's point of view, at various points throughout the evening.

Details

The in-line sniffer consists of a Dell laptop placed on top a 'pod', a two slot PCI expansion bus, connected to the laptop by a high-speed serial cable plugged into a 'Magma' CardBus card. The pod contains two custom-built Gigabit Ethernet NICs, hacked in various ways and given dedicated RAM (128 MB) so that they can dump the packets which they receive into this dedicated RAM buffer. These custom-built NICs cannot transmit packets in the normal sense … Windows can't see them, for instance … they are dedicated packet capture engines. The tap contains circuitry which xeroxes the bits which pass through it (running between Indigo and j4sr-a-esx), sending the xeroxes to the pod. Cables run from j4sr-a-esx into an external copper 'tap', from the 'tap' into the pod, from the pod back to the tap, from the tap into Indigo. The tap is passive – if it loses power, then it loses its xeroxing capability … but it continues to allow packets to transit.

This person starts captures at appropriate times, watches the real-time throughput graphs for expected behavior (they should jump high whenever the Tidal jobs are running … if they aren't, this persons informs the MC of this, as this indicates a problem), and saves traces at the end of each test to the Indigo directory, updating the text file there with comments.

Trace Naming Convention:
Indigo-{timestamp}.enc
e.g. indigo-2015.enc

I have deliberately underutilized this person, because I predict that the traces captured by this sniffer will be critical to determining whether or not j4sr-a-esx is dropping packets, and a 'j4sr-a-esx dropping packets' scenario is an early contender for the root cause of these problems. i.e. this task is way important, and I don't want this person distracted by too many responsibilities.

Directory
\\sluf22\BlueHeat\Data\2005-12-04\Indigo

Preparation
- Verify that you know how to start a capture, stop a capture, save a file (to ENC format), copy the file to the 'Indigo' directory, and update the 'Indigo-Traces.txt' file.
- Coordinate with Client to capture a baseline prior to 8:00pm.

SWITCH OPERATOR
Overview
This person will grab counter data off j4sr-a-esx and save it to text files, along with comments annotating when the data was acquired. This person's chief function is to record j4sr-a-esx's CLI-based view of the event.

Details
This person ssh's to j4sr-a-esx and types the 'enable' command to acquire super-user status. At the beginning of a Client Operator/Indigo Sniffer dance routine, this person types "clear counters" to zero out the command-line visible counters. At the end of the routine, s/he types "sh port mac 6/47" to display the port counters for module 6, port 47, which is where Indigo attaches and saves the output to a text file, stores the text file in the 'j4sr-a-esx' directory, and updates 'j4sr-a-esx.txt' with comments about this file. And then repeats the next time Client Operator & Indigo Sniffer head for the dance floor.

The idea here is to zero the counters *just prior* to the beginning of Client Operator and Indigo Sniffer starting their captures …capture the output of "sh port mac 6/47" *just after* Client Operator and Indigo sniffer stop their captures … save the output … and then repeat.

Data File Naming Convention:
Switch-{timestamp}.txt
e.g. switch-2015.txt

Directory
\\sluff22\BlueHeat\Data\2005-12-04\Switch

Preparation
- Please save a baseline copy of 'sh port mac 6/47' and a baseline of the entire output of 'sh port' *before* ever clearing counters.
- Verify that you can ssh to j4sr-a-esx, jump to super-user, view the output of 'sh port mac 6/47', and clear counters.

REAL-TIME WATCHER

Overview

This person will run the in-house BlueArc Tool plus What's Up Gold, watching various parameters on Indigo and j4sr-a-esx in near-real-time. This person's chief function is to observe near-real-time graphs, attempting to see correlations between them and the events occurring around the SDS servers, the Client, and Indigo. This role is heavily decoupled from the rest of the team – s/he doesn't have to 'do' anything at any particular moment, doesn't have to coordinate any activities with anyone else … s/he is watching, analyzing, and grabbing screen shots as s/he sees fit.

Details

See \\sluf22\vdops\Utilities\Network-Analysis\WhatsUp for the installer and a stack of patches.

Counters to watch on j4sr-a-esx: ifInOctets, ifOutOctets, ifOutDiscards
Port 6/47 = ifIndex.202
Port 6/48 = ifIndex.203
Port GEC47-48 = ifIndex.241

Port 6/47: ifInOctets.202, ifOutOctets.202, ifOutDiscards.202
Port 6/48: ifInOctets.203, ifOutOctets.203, ifOutDiscards.203
GEC (port 6/47 + 6/48 bonded): ifInOctets.241, ifOutOctets.241, ifOutDiscards.241

At key moments, this person takes screen shots of the various graphs and saves them in the 'Indigo' directory, maintaining a text file there annotating each screen shot (see 'Indigo-Screenshots.txt' for example).

Directory
\\sluf22\BlueHeat\Data\2005-12-04\RealTime

Preparation
- Familiarize yourself with how the BlueArc tool and WUG work.
- Practice interpreting the graphs while copying files to and from Indigo
- Practice taking screen shots of interesting graphs
- Record baseline graphs in the 'Indigo' directory (probably pretty flat)

MANAGEMENT SUPPORT

Overview

This person provides oversight, support, and fills in as needed.

Details

I would like to keep this person away from the nitty-gritty, so s/he can keep an eye on the larger picture.

MASTER OF CEREMONIES

Overview

Calls off the steps of DaPlan, making sure that we all know which step we are on. This person's chief function is to make sure that we execute the steps in DaPlan, in order and in sync.

Details

This person owns the conference call which links us all together. This person announces the time stamp which Client Operator, Indigo Sniffer, and Switch Operator use when they save their data.

Preparation

- ▪ Figure out how to use the conferencing feature on our phones.

PREPARATION

Analyze the requirements of your role, determine how long you think you need to perform your preparation steps, and arrive at whatever time suits you. But please realize that 'DaPlan' may change significantly prior to 4:00pm … I will try to initiate a freeze on major changes at 4:00pm … so thereafter, you can be reasonably assured that your preparation steps won't change significantly.

Feel free to print copies of DaPlan as you see fit. Realize that this is a dynamic document and may change right up to 8:00pm … or even during the event, if we discover flaws in our process. I will distribute RC copies at the 7:00pm meeting and Gold copies thereafter.

TIMELINE

Arrive

Time	Task	Who
2:00pm	Add on-site team to 'duty' group	MC
4:00pm+	Perform the preparation tasks for your role	All
4:40pm	Insert in-line sniffer	Stuart/Rick
4:45pm	Disable Indigo 2nd NIC	Stuart/Rick
6:30pm	Print RC copies of DaPlan	MC
7:00pm	Assemble in j4-120 for a review of DaPlan	All
7:20pm	Disperse to locations	All
7:30pm	Distribute Gold copies of DaPlan	MC
7:35pm	Set-up conference call	MC
7:50pm	Acquire verbal 'ready' from each participant	MC
7:55pm	Announce beginning of event to 'duty'	MC

Begin Service Disruption

Time	Task	Who
8:00pm	Initiate Tidal jobs	Tidal Monitor

Capture First Round

Time	Task	Who
8:05pm	Start Client capture	Client Operator
8:05pm	Start Indigo capture	Indigo Sniffer
8:07pm	Start Client copy	Client Operator
8:10pm	Announce end of Client Copy	Client Operator
8:11pm	Stop Client capture	Client Operator
8:11pm	Stop Indigo capture	Indigo Sniffer
8:15pm	Save data files, update comment files	All

Capture Second Round

Time	Task	Who
8:30pm	Acquire verbal 'ready' from participants	MC
8:35pm	Start Client capture	Client Operator
8:35pm	Start Indigo capture	Indigo Sniffer
8:37pm	Start Client copy	Client Operator
8:40pm	Announce end of Client Copy	Client Operator
8:41pm	Stop Client capture	Client Operator
8:41pm	Stop Indigo capture	Indigo Sniffer
8:45pm	Save data files, update comment files	All

Capture Third Round

Time	Task	Who
9:00pm	Acquire verbal 'ready' from participants	MC
9:05pm	Start Client capture	Client Operator
9:05pm	Start Indigo capture	Indigo Sniffer
9:07pm	Start Client copy	Client Operator
9:10pm	Announce end of Client Copy	Client Operator
9:11pm	Stop Client capture	Client Operator
9:11pm	Stop Indigo capture	Indigo Sniffer
9:15pm	Save data files, update comment files	All

Capture Fourth Round

Time	Task	Who
9:30pm	Acquire verbal 'ready' from participants	MC
9:35pm	Start Client capture	Client Operator
9:35pm	Start Indigo capture	Indigo Sniffer

9:37pm	Start Client copy	Client Operator
9:40pm	Announce end of Client Copy	Client Operator
9:41pm	Stop Client capture	Client Operator
9:41pm	Stop Indigo capture	Indigo Sniffer
9:45pm	Save data files, update comment files	All

Reboot

Time	Task	Who
9:40pm	Reboot Indigo	Tidal Monitor

Capture Fifth Round

Time	Task	Who
10:00pm	Acquire verbal 'ready' from participants	MC
10:05pm	Start Client capture	Client Operator
10:05pm	Start Indigo capture	Indigo Sniffer
10:07pm	Start Client copy	Client Operator
10:10pm	Announce end of Client Copy	Client Operator
10:11pm	Stop Client capture	Client Operator
10:11pm	Stop Indigo capture	Indigo Sniffer
10:15pm	Save data files, update comment files	All

Capture Sixth Round

Time	Task	Who
10:30pm	Acquire verbal 'ready' from participants	MC
10:35pm	Start Client capture	Client Operator
10:35pm	Start Indigo capture	Indigo Sniffer
10:37pm	Start Client copy	Client Operator
10:40pm	Announce end of Client Copy	Client Operator
10:41pm	Stop Client capture	Client Operator
10:41pm	Stop Indigo capture	Indigo Sniffer
10:45pm	Save data files, update comment files	All

Back-Out

Time	Task	Who
11:00pm	Restore Indigo second NIC	Tidal Monitor
11:01pm	Remove in-line sniffer	Stuart
11:02pm	Pack-up in-line sniffer	Stuart
11:05pm	Cancel Tidal jobs	Tidal Monitor
11:05pm	Annouce end of event to 'duty'	MC
11:10pm	Remove participants from 'duty'	MC

Time	Task	Who
11:15pm	Send 'outages' notice	MC

Fold Up the Tents

Time	Task	Who
11:00pm	Record observations and write final notes as you see fit	All
10:15pm+	Go home	All