Living in an Imperfect World –
Disasters and Service Interruptions
Large and Small

Robert Gezelter Software Consultant
35 – 20 167th Street, Suite 215
Flushing, New York 11358 – 1731
United States of America

+1 718 463 1079
gezelter@rlgsc.com

Monday, June 3, 1996
5:00 pm – 5:50 pm
Room 132

Spring 1996 US DECUS Symposium
America's Center
St. Louis, Missouri

Robert Gezelter
Software Consultant 35 – 20 167th Street, Suite 215, Flushing, New York 11358 – 1731 USA
+1 718 463 1079

"Sooner or later, it was bound to happen. On June 30, 1908, Moscow escaped destruction by 3 hours and 4,000 km – a margin invisibly small by the standards of the universe. On February 12, 1947, another Russian city had a still narrower escape, when the second great meteorite of the 20th century detonated less than 400 kilometers from Vladivostok, with an explosion rivaling that of the newly invented uranium bomb.

In those days, there was nothing that men could do to protect themselves against the last random shots in the cosmic bombardment that had once scarred the face of the Moon. The meteorites of 1908 and 1947 had struck uninhabited wilderness; but by the end of the twenty-first century, there was no region left on Earth that could be safely used for celestial target practice. The human race had spread from pole to pole. And so, inevitably ...

Robert Gezelter
Software Consultant

At 0946 GMT on the morning of September 11 in the exceptionally beautiful summer of the year 2077, most of the inhabitants of Europe saw a dazzling fireball appear in the eastern sky. Within seconds it was brighter than the Sun, and as it moved across the heavens - at first in utter silence - it left behind it a churning column of dust and smoke.

Somewhere above Austria, it began to disintegrate, producing a series of concussions so violent that more than a million people had their hearing permanently damaged. They were the lucky ones.

Robert Gezelter
Software Consultant

NOTES

2

Moving at 50 kilometers a second, a thousand tons of rock and metal impacted on the plains of northern Italy, destroying in a few flaming moments the labor of centuries. The cities of Padua and Verona were wiped from the face of the Earth; and the last glories of Venice sank forever beneath the sea as the waters of the Adriatic came thundering landward after the hammer blow from space."

— Rendezvous with Rama
Arthur Clarke
copyright 1973

Robert Gezelter
Software Consultant

Or,
if you prefer the real world –

World Trade Center,
New York, New York
12:18 EST, 2/28/93

Robert Gezelter
Software Consultant

NOTES

Chicago "Loop" District
Spring 1992

Robert Gezelter
Software Consultant

---

50 years ago:

Power – 1 week outage not unusual
Telephone – rarely present
Computers – non-existant

Robert Gezelter
Software Consultant

NOTES

4

40 years ago:

Power – 1 week outage not unusual
Telephone – 1 week outage not fatal
Computers – non-existant

Robert Gezelter
Software Consultant

30 years ago:

Power – 1 day outage unusual
Telephone – outage inconvenient
Computers – rare

Robert Gezelter
Software Consultant

NOTES

20 years ago:

Power – 1 day outage unusual
Telephone – important, outage impairs normal business
Computers – common, but not mission critical in most businesses

Robert Gezelter
Software Consultant

10 years ago:

Power – 1 hour outage unusual
Telephone – mission critical
Computers – any interruption impairs business;
Arrival of PC

Robert Gezelter
Software Consultant

NOTES

Today

Power – "Normal" outage less than 5 minutes

Telephone – absolutely vital for most businesses

Computers – mission critical, any unavailability has severe impact

Networks – both internal and external absolutely vital to all business operations

Robert Gezelter
Software Consultant

Today:

PCs/Workstations
Servers/Superminicomputers
PBX/Phones
LANs/WANs
World Wide Web/Internet

Robert Gezelter
Software Consultant

NOTES

7

Today:

> **No phones**
> **No E-mail**
> **No World Wide Web**
> **No Voicemail**
> **No Customer Information**
> **No Inventory**
> **No Charge Cards**
> **No Databases**

Robert Gezelter
Software Consultant

Service interruptions,
like Death & Taxes,
are a Fact of Life

Robert Gezelter
Software Consultant

NOTES

The Issue:

Computers inspire visions of omnipotence. The reality is quite different.

Robert Gezelter
Software Consultant

When designing any type of network your control over the network infrastructure is limited

Robert Gezelter
Software Consultant

NOTES

Common Hazards

Custodial personnel
Trades personnel
Common carriers

Acts of Clod

Robert Gezelter
Software Consultant

Common Hazards (Cont'd)

Weather
Earthquakes
Floods
Auto, Rail, Plane Incidents
Structural failure

Acts of God

Robert Gezelter
Software Consultant

NOTES

Any hazard, in an instant, can turn your perfectly functioning high-speed network into a useless collection of inert copper wire and glass fiber

Robert Gezelter
Software Consultant

Hardware and Human Factors:

Live Wire Cut – AT&T 1/4/91
Power outage at NYC
Switching Center
– AT&T 9/17/91
Hinsdale Fire
– Illinois Bell 5/9/88
Second Avenue Fire
– NY Bell, 2/27/75

Robert Gezelter
Software Consultant

NOTES

Software Failures

Arpanet Naturally Occuring Virus
    – 10/27/80
Switch Failures in
    three major cities
    – DSC 6/91

Robert Gezelter
Software Consultant

Conclusion:

There are tigers in the woods!

The world is a nasty place, you
    can get hurt!

Robert Gezelter
Software Consultant

NOTES

Amateurs study tactics,
Professionals study logistics.

– Red Storm Rising
Tom Clancy
copyright 1986

Robert Gezelter
Software Consultant

Lesson from World History

Supply lines are your umbilical cord. England, Japan, Hawaii, North Africa. Long Supply lines are fatal

Robert Gezelter
Software Consultant

NOTES

The longer your umbilical cord – the greater the danger

Robert Gezelter
Software Consultant

*99% uptime =
n * .01 probability of failure*

*where there are n links
in the chain*

Robert Gezelter
Software Consultant

NOTES

Your PC is:

**connected to the LAN
3 servers
bridged to 4 other offices
each server has its own
connections**

Robert Gezelter
Software Consultant

*Very quickly, in realtime
terms, your data becomes
unreachable*

Robert Gezelter
Software Consultant

NOTES

Possible Solutions:

Backup Connectivity (partial)
Alternate sites
Realtime independence

Robert Gezelter
Software Consultant

Backup Connectivity

"Last Mile" problem
The Data still exists,
yet is unreachable.

Robert Gezelter
Software Consultant

NOTES

Backup of Data on other systems

Avoids loss of data.
No answer to "Last Mile"

Robert Gezelter
Software Consultant

Last Mile Problem

Most connections generally go through a single routing for the last mile (or kilometer). A single accident has a high probability of disrupting all paths.

Robert Gezelter
Software Consultant

NOTES

Solution to Last Mile Problem

Data required in realtime must be in the local facility, within the campus, building, floor, or workgroup

Robert Gezelter
Software Consultant

Example Applications: Electronic Mail

OpenVMS Mail normally requires the local node and remote node online, and a connection path between them to send a message.

Robert Gezelter
Software Consultant

NOTES

18

Drawback

If any link in the chain is down, you cannot send Electronic mail. In a large network, some link or node is always out of service.

Robert Gezelter
Software Consultant

Alternate:
Store and Forward Systems e.g. Internet Mail

Mail program spools message into system spool directory (mailbags) for transmission (possible later) to next link in chain.

Mail Exchangers

Process continues until destination

Robert Gezelter
Software Consultant

NOTES

Conclusion:

Store and Forward permits even severe outages to disappear from outside view. Front office requirements for long distance online connections MUST be viewed in context.

Robert Gezelter
Software Consultant

Principles:

**Constant Online Access
– Local Data
7 * 24 Availability Offsite
– Dispersal of Alternate Sites and capacity
Occasional, non-realtime Access
– Remote via deferred Store and Forward facilities**

Robert Gezelter
Software Consultant

NOTES

Network component failures are inevitable. Planning must take these failures into account when configuring the network.

Robert Gezelter
Software Consultant

It is possible to provide extremely high levels of availability IF proper precautions are taken.

*However,
100%, 7 day a week,
24 hour a day availability
for every network
component is unrealistic
and not cost effective*

Robert Gezelter
Software Consultant

NOTES

Questions?

Robert Gezelter Software Consultant
35 – 20 167th Street, Suite 215
Flushing, New York 11358 – 1731
United States of America

+1 718 463 1079
gezelter@rlgsc.com

Living in an Imperfect World: Disasters and Service Interruptions
Slide 42   © 1992, 1996, Robert Gezelter, All Rights Reserved

Robert Gezelter   +1 718 463 1079
Software Consultant 35 – 20 167th Street, Suite 215, Flushing, New York 11358 – 1731 USA

NOTES