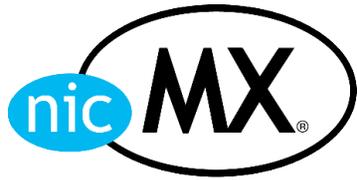


Network
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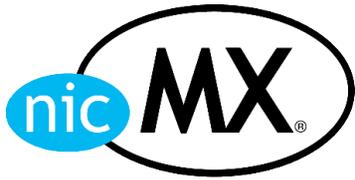
NIC Mexico's DRP

ccNSO Members Meeting
Cartagena de Indias, Colombia



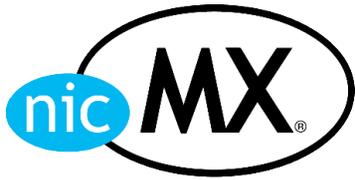
DRP first reaction...

- Are you paranoid? Why should we have a **DRP?**
- México is a disaster prone country but Monterrey is not. So, Why should we have a **DRP?**
- Show me statistics of disasters that had happened in Monterrey in the past. **Certainly we shouldn't have a DRP!**
- We are not the military... So, Why should we have a **DRP?**



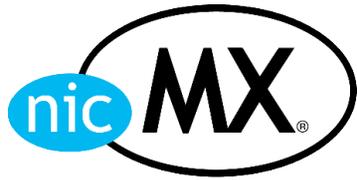
2009, 2010 disaster after disaster

- In April 2009, the AH1N1 pandemic forced the shutdown of México's economy for a week.
 - We had to close our main office for a week but we continued operations from home.
- In June 2010, Hurricane Alex destroyed Monterrey and affected connectivity around the country for days.
 - Main roads are still being repaired in Monterrey and they will not be fully rebuilt until the second half of 2011.
 - Most employees were not able to drive to our main office for days.
- **All** business units of NIC México remained operational during these two catastrophic disasters.
 - Customer service and internal project development were never interrupted.
- Working from home lowered the risk for our personnel and...
 - **no employee was injured during the execution of the DRP.**



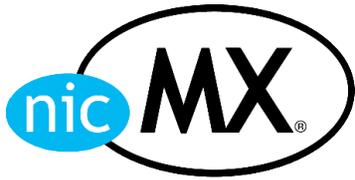
NIC México's Business Units SLA's

Service	Registry.MX	NIC México Registrar	NIR
# DNS Zones	450K	240K	
DNS	100%	100%	100%
EPP / Hosting / EPP	99.9%	99.9%	99.9%*
Extranet (WUI)	99.9%	99.9%	99.9%
Intranet (GUI), CRM, ticketing system, e-mail, messaging, customer support chat, PBX	99.9%	99.9%	99.9%
	Resume <8hrs	Resume <8hrs	Resume <8hrs



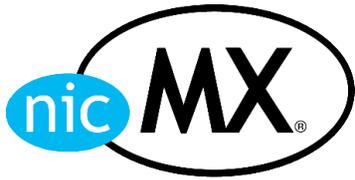
NIC México's business units

- Corporate services:
 - Software developing, infrastructure management, payroll, accounting, and various miscellaneous operations must **remain operational under a best effort basis.**

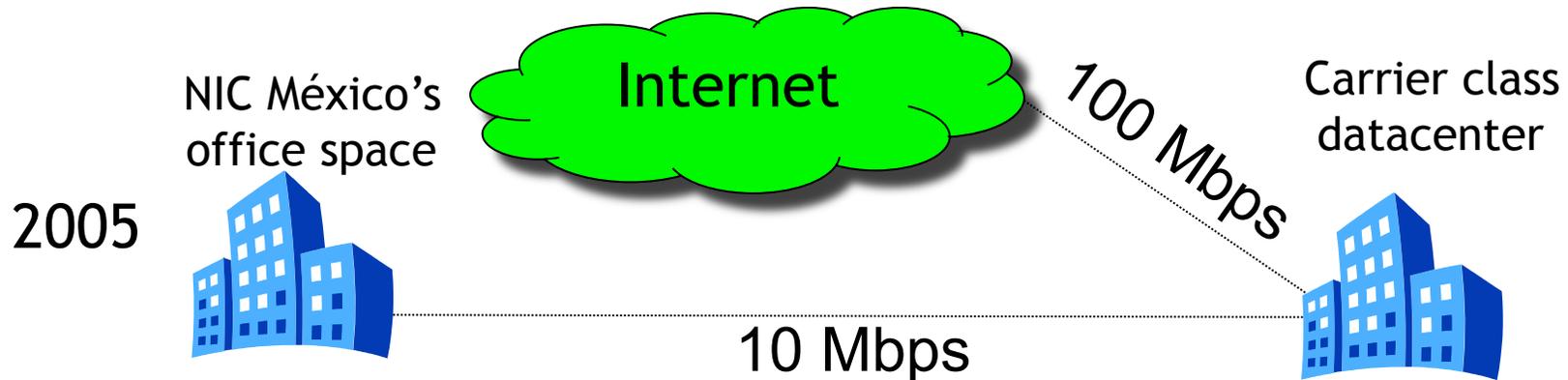


NIC México's DRP first iteration

- The first objective was to achieve 100% uptime for DNS.
- We implemented anycast in all NS in July 2005 and since then we achieved 100% uptime.
 - Although, we started using anycast in one NS in 2003.
- But, DNS was the easiest part...

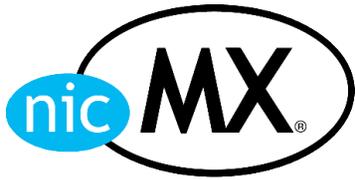


NIC México's DRP first iteration



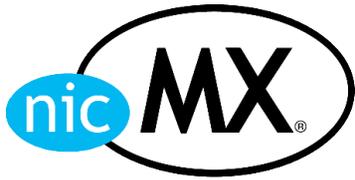
1. CRM, ticketing, software development.
2. totally managed by our personnel.
3. Operational for 48 hours with diesel stored on site.

1. Services offered to external customers that required 99.9% uptime
2. Every component (servers, routers, firewalls, switches) of our infrastructure is redundant in this datacenter.
3. Operational for weeks with diesel stored on site.



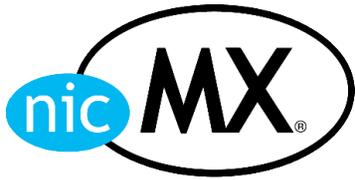
NIC México's DRP first iteration

- Lucky for us a disaster never stroke during the first iteration of our DRP.
- We do simulations of the DRP each half (all employees must work from their home).
- Lessons learned:
 - We are not experts in datacenter management and it became very difficult to keep our internal services (CRM, ticketing, software development) running in case of a disaster because we depended in the small datacenter in our main office.
 - For example: we are a very small customer for a diesel provider.
 - If all employees connect from their home then the bandwidth between our main office and datacenter became a bottleneck.
 - When employees connect to the VPN the services that normally used the LAN where now using the WAN connection.
 - Applications (software developing and GUI Intranets for example) running in PC's required a lot bandwidth and the standard 2Mbps ADSL (!) connection offered by ISPs also became a bottleneck.

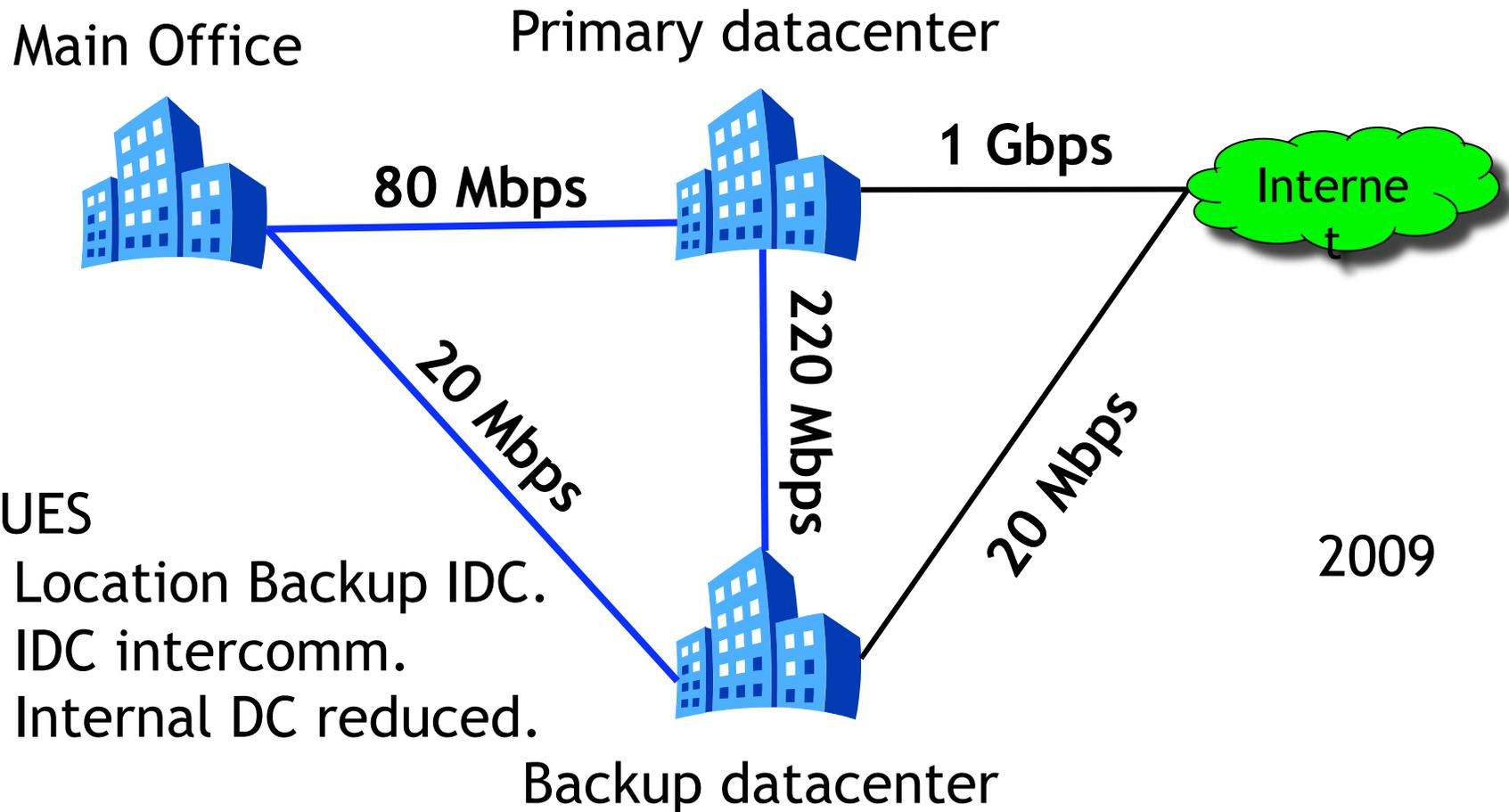


NIC México's DRP second iteration

- The goals for the second iteration were:
 - **All** personnel must be able to work comfortably from their home using a 1Mbps broadband connection.
 - Zero, nothing, nada should depend on the small datacenter in our main office.
 - A backup datacenter must be installed.
 - All external and internal services must be offered from the main and the backup datacenter with redundancy.
 - Real time synchrony of data must be achieved between main and backup datacenter.
 - The technical aspects of the DRP must be tested continually.
 - ...and world peace must be achieved in less than 12 months!

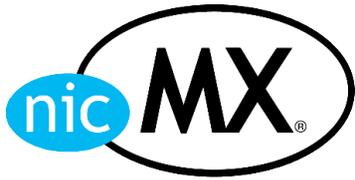


NIC México's DRP second iteration



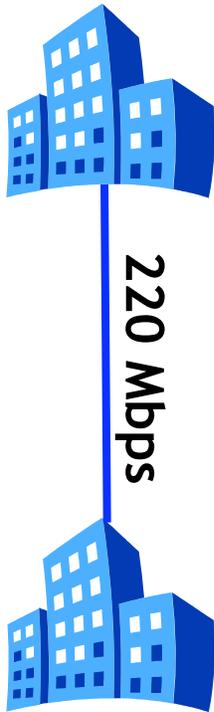
ISSUES

1. Location Backup IDC.
2. IDC intercomm.
3. Internal DC reduced.



NIC México's DRP second iteration

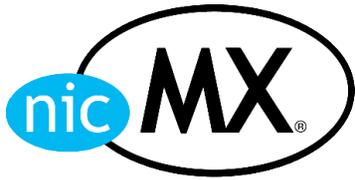
Primary datacenter



Backup datacenter

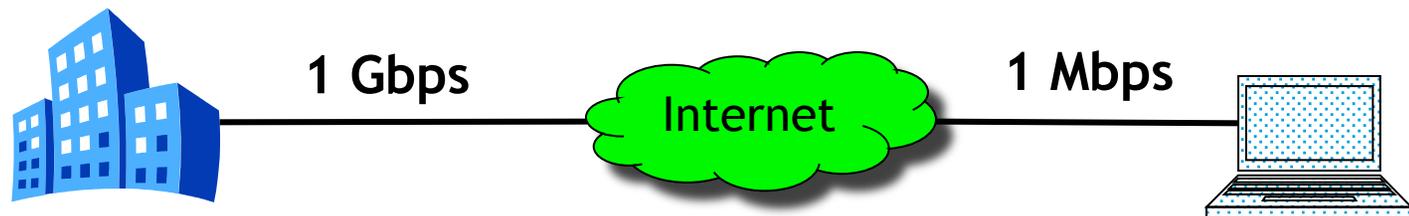
■ Keeping information and backups in sync:

- Databases are kept in sync between the main and backup datacenter.
- Backups are made on disk and they are transferred between the main and backup datacenter.
- Backups are also copied and encrypted on tape backups.
- Tape backups are kept in a safe in two places, our main office and in an external facility (external service provider).



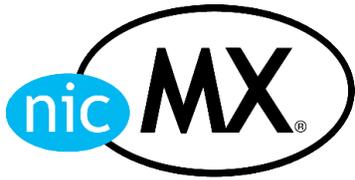
NIC México's DRP second iteration

Primary datacenter



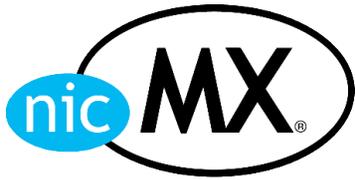
■ VPN access:

- VPN concentrators are installed on our main and backup datacenters. Our main datacenter has two redundant 1 Gbps connection to the Internet.
- Bandwidth hungry applications are provided with Citrix (RDP) or WUI (web user interface). Personnel can comfortably work using a 1Mbps connection.
 - For example: developers work in virtual environments that are accessed through RDP (remote desktop protocol).
- In order to access the company resources the users must logon to a VPN concentrator no matter if they are in their home or in the main office, thus infrastructure to support our operations from remote locations is tested every day.



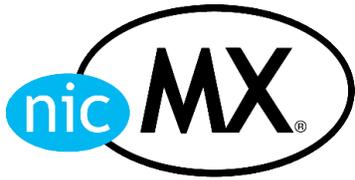
NIC México's DRP second iteration

- **System administration:**
 - All of the equipment used in our infrastructure can be managed by using two different access methods.
 - For example: servers are all equipped with remote administration cards and also a KVM over IP is installed in each datacenter.
 - Management access is provided with IPsec tunnels through the Internet but a PSTN access is also available.
 - Alerts are sent to a “smtp to sms” gateway on the ISP infrastructure and they are also sent directly to the cell phone network with a GSM modem (sms msg) in each of our datacenters.



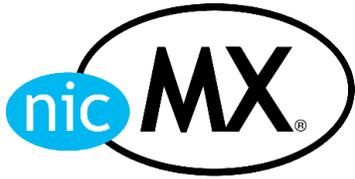
NIC México's DRP second iteration

- **Telephone service:**
 - The telephone system was migrated to VoIP around 2008 allowing the personnel to access this service remotely.
 - The PBX and digital lines are the only remaining pieces of infrastructure still installed in the small datacenter in our main office.
 - In the first half of 2011, we will move the PBX and digital lines to our main datacenter.



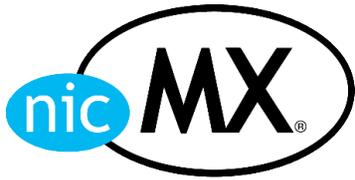
First Disaster: Flu H1N1

- The second iteration was completed two months before the first major disaster hit our city (several Countries).
- The detection of a new strain of the swine flu in Mexico created a global alert and our government ordered that all business and schools remain closed for a whole week.
- Mexico's economy was knocked down but we remained fully operational. Services were provided and everybody including system administrators, helpdesk and telephone support personnel worked from their home.



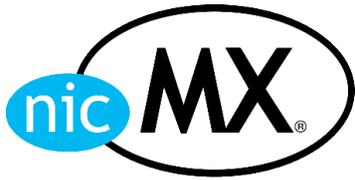
Second disaster: Hurricane Alex





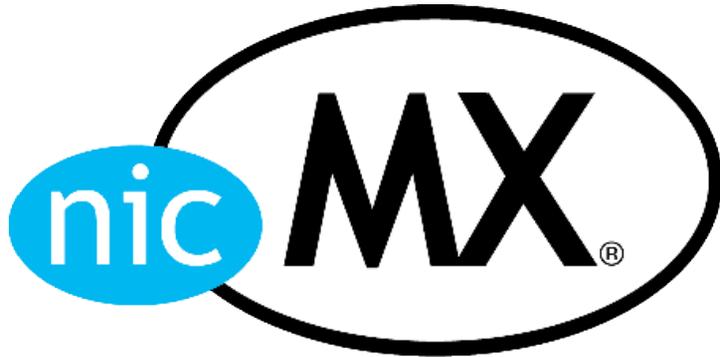
Second disaster: Hurricane Alex

- In 2010 our decision to locate our backup datacenter in Monterrey payed high dividends.
- Hurricane Alex destroyed major freeways in Monterrey and fiber lines from Monterrey to the rest of Mexico were severely affected.
- Personnel were not able to drive to our main office for three days and for one week most of the personnel worked from home.



Conclusion

- NIC Mexico's DRP have allowed us to remain operational even when major disasters strike in our city or the country.
- Continuously testing of our DRP allow us to react quickly to any eventuality and executing a DRP is as easy as telling everyone to go home and work from there.
- We hope not to use the DRP again, but we are prepared for everything.
- ...unless Maya's End of the World Prophecy becomes true!



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NIC Mexico's DRP

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