

# Server Virtualization MassDEP's Experience

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# Who is MassDEP?

- **Part of Energy & Environmental Affairs**
- **Protect environment & public health:**
  - Clean air and water,
  - Safe management of toxics & hazards,
  - Recycling of solids & hazardous wastes,
  - Cleanup of hazardous waste sites & spills,
  - Preservation of wetlands & coastal resources.
- **Agency balancing increased demands and diminishing resources (like you)!**

# What were the Problems?

- Growth of energy & carbon foot print.
- Huge workload - more, more, more!
  - Rolled out 3-tier architecture,
  - Expanded to 4 stage environment,
  - Developing new applications/databases,
  - Promoting web services on web servers,
  - Increasing demand for public data access.
- **No additional resources on horizon.**

# What were the Problems?

- Storage needs - not met & impacting mission!
  - Ability to save photos & videos of inspections - stymied.
  - Plans to expand public access - on hold.
  - Hopes to reduce driving to offices – dashed.
- MassDEP relying on 6 servers for storage.
  - Data backup of storage took 250 hours over weekend.
  - **Spending 1 FTE just on data backups.**

# Why Virtualization?

- Major part of Green IT plan, already:
  - Turning off devices,
  - Implemented free open source PC management software (EZ-GPO),
  - Reducing printing/paper use,
  - More virtual meetings, less travel,
  - Procuring green products,
  - Recycling – always.

# Why Virtualization?

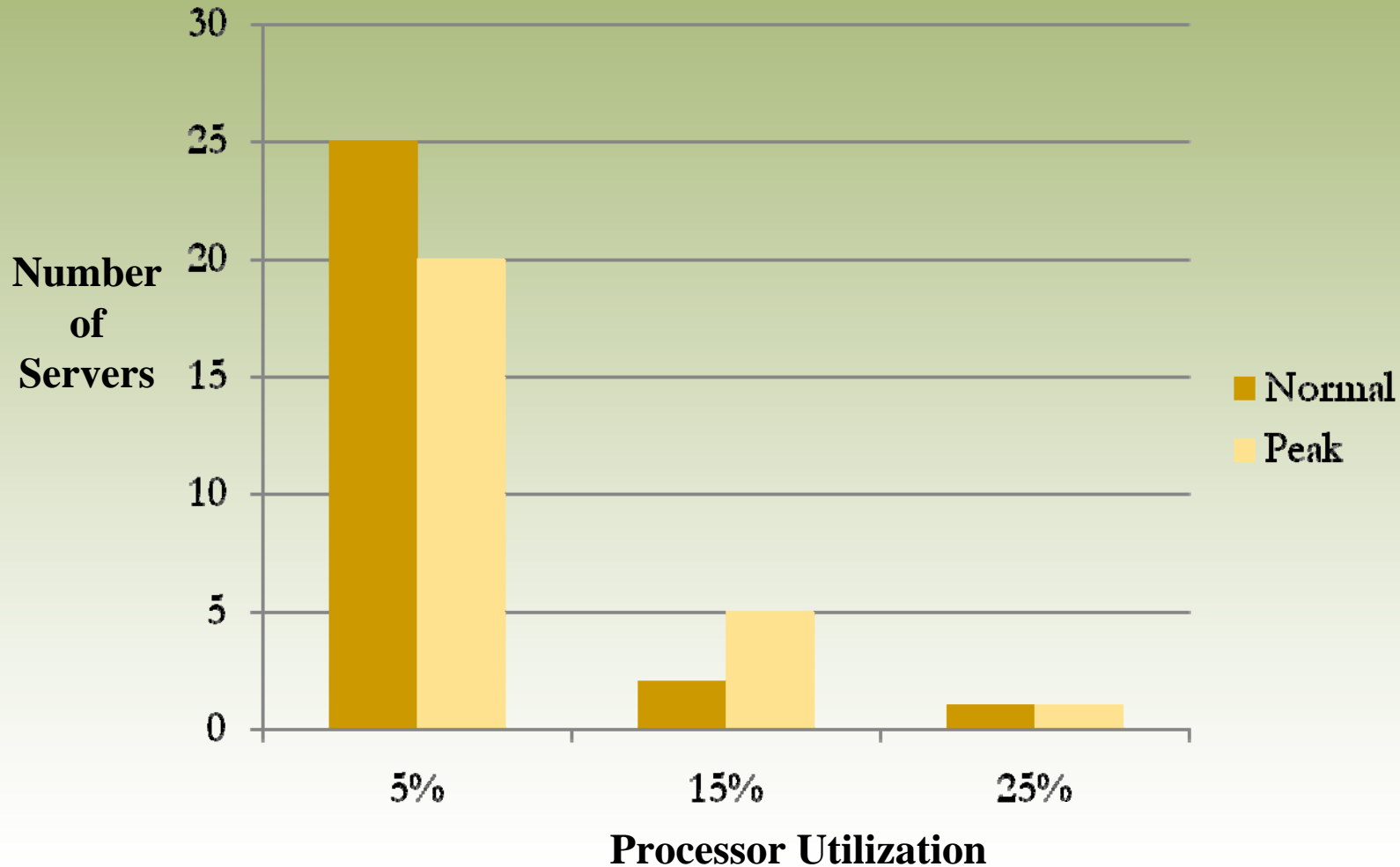
- **Server Sprawl (67) - with no end in sight.**

Most servers use 10-15% of processing power & very little storage.

Type of Server	Servers
Database/Application	25
Web Servers	21
File Servers	18
Infrastructure	3

- **Insufficient staff to manage sprawl – patches, troubleshooting, rebuilding.**

# MassDEP Server Use Assessment



# Why Virtualization?

- Servers use 500 kWh per year.
- Servers generate 2000 BTUs per hour.
- Increase in heat problems – more AC & more staff time spent addressing issue.
- Industry “hype” claims reduction of energy use of 40%.
- MassDEP runs server room, not data center – we are hoping for 30% less.

# How Virtualization?

- **Very cautiously (too cautiously)!**
- **Investigated technology:**
  - **Talked with others who virtualized.**
  - **Read IT magazines, research articles.**
  - **Attended seminars, trade shows/expos.**
- **Invited firm to conduct “free assessment” on segment of servers to determine feasibility.**

# How Virtualization?

- **MassDEP published RFQ.**
  - **Storage & virtualization combined.**
  - **Hardware & software.**
  - **Installation & migration services.**
  - **Technology transfer & training of staff**
- **Stuck to the project plan – scheduled, disciplined, rigorous & completed.**

# When Virtualization?

- Investigation, learning, planning – 2 years.
- Pre-assessment – 2 months.
- Draft RFQ – 1 week in February.
- Select/hire contractor – 3 weeks in March.
- Implement project by June 30<sup>th</sup> – 3 months.
- Availability of budget drove MassDEP project – other options are possible.

# When Virtualization – other options?

- Incremental with scalable solution.
- Environmental Affairs – partially funded, late in fiscal year.
  - Used MassDEP RFQ as template.
  - Only ordered hardware & software.
  - Over summer installed it themselves!

# Results of our Storage & Virtualization?

- 52 of 67 Servers were virtualized
- Easier to manage
  - Building a server - before 1 ½ days, now ½ hr.
  - Applying patches - before 1 day, now 3 hrs.
- Heat generating issues
  - Winter and spring - 12 crisis events,
  - Summer – Not a single AC crisis!
- Energy Use – Collecting data – stay tuned.

# Results of Storage & Virtualization?

- Storage grew from 15 terabyte of unusable to 150T available now – 300T later.
- Public access project is underway!
- Storage backups:
  - 5 different types to 1.
  - 250 hours to 24 hours.
  - Less frequency for tape changes.
  - 1 FTE before, now  $\frac{1}{4}$  of an FTE.

# Lessons learned?

- Less time fretting about technology & feasibility.
- Gartner's Top 10 strategic technologies to impact business - #1 is Virtualization.
- Don't do pre-assessment.
- Start small or start big, just get going.

# What's next for MassDEP?

**Plan**

- Investigate data deduplication

**Plan**

- Check hibernation options

**Plan**

- Maximize tiered storage capabilities

**Do it**

- Implement deduplication

**Do it**

- Implement hibernation & tiered storage

**Do it**

- Measure success

# What's next for you?

**Plan**

- Benchmark energy use & costs

**Plan**

- Estimate resources now & after

**Plan**

- Review server growth & replacement plan

**Do it**

- Start small or go for it all – based on budget

**Do it**

- Hire contractor or do it yourself

**Do it**

- Virtualize & measure success

# Want more information?

- MassDEP's RFQ is posted on web
  - [www.comm-pass.com](http://www.comm-pass.com) search for RFQ # ITO 02-29-2008.
- This presentation will be posted on Government Technology website after conference.
- eMail me @ [Deborah.Quinn@state.ma.us](mailto:Deborah.Quinn@state.ma.us)
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