



## The ROI of vDC

# Kevin Carr, Director IT Denton County

Director of Information Technology since 1997

- County's technology infrastructure
- Delivery of technology services & support
- Development of County's technology strategy
- Desktop support & training
- Server & network operations
- GIS, telecommunications, appdev, Web sites, access control & surveillance cameras



# Denton County vDC



# Denton County: 5-Year Savings for 96 Servers

	Unit Cost	Physical	Virtual	Savings
<b>Servers (Existing)</b>	\$10,000	<b>\$1,200,000</b>	<b>\$136,170</b>	\$1,063,830
<b>New Servers (5/yr)</b>	\$10,000	<b>\$250,000</b>	-	\$250,000
<b>Power/Cooling Servers</b>	\$75	<b>\$432,000</b>	<b>\$27,000</b>	\$405,000
<b>Power/Cool New Servers</b>	\$75	<b>\$ 56,250</b>	-	\$ 56,250
<b>Maintenance</b>	-	-	<b>\$32,648</b>	<\$32,648>
<b>Windows Srvr (74 Std)</b>	\$ 789	<b>\$ 125,183</b>	-	\$125,183
<b>Windows Srvr (10 Ent)</b>	\$ 2,559	<b>\$ 54,850</b>	<b>\$75,000</b>	<\$20,150>
<b>SQL Srvr (16 Std)</b>	\$ 6,285	<b>\$ 215,493</b>	-	\$215,493
<b>SQL Srvr (0 Ent-8 CPU)</b>	\$23,910	-	<b>\$159,400</b>	<\$159,400>
<b>Total</b>		<b>\$2,360,633</b>	<b>\$430,218</b>	\$1,930,415

# Virtualization Investment

## Denton Investment

Unit	Cost
Virtualization & virtual switch licenses	\$ 55,000
Storage	\$ 42,000
9 Dell R710 Hosts w/96 GB RAM	\$ 137,000
Services/Training	\$ 33,000
<b>Total</b>	<b>\$267,000</b>

Versus savings of \$1,930,000

ROI=580% over 5 years. 8.8 month payback

# Other Benefits

High Availability / Fault Tolerance for all servers

Vastly improved disaster recovery

Enhanced performance (All VMs on SAN, 10Gb Network)

Significantly reduced staff time requirements

Improved security / management



# Denton County: Before & After Virtualization

## Physical

125 x86  
Physical Servers

325 tons  
of annual CO<sub>2</sub> emissions

NO  
server clustering

Limited Network Capacity

Limited Data Protection

## Virtual

9  
Physical Virtualization Hosts

38 tons  
of annual CO<sub>2</sub> emissions

HA  
for all servers

10 GB DCE Network  
(eventually)

Backups @ VM & File Levels  
DR foundation for all servers

# County 5-Year Savings for 335 Servers (Co-Lo)

	Unit Cost	Physical	Virtual	Savings
<b>Servers (Existing)</b>	\$10,000	<b>\$4,187,500</b>	<b>\$425,170</b>	\$3,762,500
<b>New Servers 42/yr)</b>	\$10,000	<b>\$2,100,000</b>	-	\$2,100,000
<b>Co-Lo Cost Existing</b>	\$326	<b>\$6,542,550</b>	<b>\$351,540</b>	\$6,191,010
<b>Co-Lo Cost New Servers</b>	\$326	<b>\$2,050,650</b>	<b>\$68,355</b>	\$1,982,295
<b>Maintenance (15)</b>	\$1,750	<b>\$52,500</b>	<b>\$160,421</b>	<\$107,921>
<b>Windows Srvr Exist</b>	\$800/\$2,500	<b>\$316,333</b>	<b>\$208,333</b>	\$108,000
<b>Windows Srvr New</b>	\$800/\$2,500	<b>\$684,950</b>	-	\$684,950
<b>SQL Srvr (5 Std)</b>	\$ 8,000	<b>\$ 66,667</b>	-	\$66,667
<b>SQL Srvr (Ent-16 CPU)</b>	\$30,000	<b>\$800,000</b>	<b>\$200,000</b>	\$600,000
<b>Total</b>		<b>\$16,801,150</b>	<b>\$1,413,649</b>	\$15,387,501

# Virtualization Investment

## County Investment

Unit	Cost
Virtualization & virtual switch licenses	\$ 190,000
Storage	\$ 275,000
Cisco UCS	\$ 500,000
Services/Training	\$ 330,000
<b>Total</b>	<b>\$1,291,000</b>

Versus savings of \$15,400,000

ROI=1092% over 5 years. 5 month payback

# ROI by Discounted Cash Flow

	Year <u>1</u> Jun-10 May-11	Year <u>2</u> Jun-11 May-12	Year <u>3</u> Jun-12 May-13	Year <u>4</u> Jun-13 May-14	Year <u>5</u> Jun-14 May-15	<b>TOTAL</b> <Beg <End
<b>Cost of Capital :</b>						
10.5%						
<b>TOTAL EXPENDITURES</b>						
# physical machines - beginning of year	353	35	35	35	35	
# virtual machines - beginning of year	40	358	358	358	358	
UCS Cost	(524,489)	-	-	-	-	(524,489)
VMware Licenses + Upgrade existing Hosts to vSphere + N1000V	(175,087)	-	-	-	-	(175,087)
EMC V-MAX Storage	(908,781)	-	-	-	-	(908,781)
MS Windows Srvr DC Edition	-	-	-	-	-	-
SQL Srvr Ent	-	-	-	-	-	-
Professional Services, incl planning	(208,150)	-	-	-	-	(208,150)
Physical Server Purchase/Upgrade	96,885	559,780	785,845	850,435	215,300	2,508,245
DMX Storage Replacement	-	629,325	-	-	-	629,325
Data Center Build-Out	700,000	-	-	-	-	700,000
Sales Tax	-	-	-	-	-	-
<b>TOTAL INVESTMENT</b>	<b>(1,019,622)</b>	<b>1,189,105</b>	<b>785,845</b>	<b>850,435</b>	<b>215,300</b>	<b>2,021,064</b>
<b>Ongoing Expenditures</b>						
Training	(78,000)	-	-	-	-	(78,000)
Physical Server Maintenance Cost (Ave. monthly)	78,374	128,676	128,676	128,980	130,431	595,137
UCS Support	(72,573)	(72,573)	(72,573)	(90,716)	(90,716)	(399,152)
VMware Maintenance (1st Yr. 6 ESX Hosts only)	(10,488)	(50,400)	(50,400)	(50,400)	(50,400)	(212,088)
VMAX Maintenance	63,951	(35,050)	(35,050)	(35,050)	(43,812)	(85,010)
	-	-	-	-	-	-
Power/Cooling - physical and virtual count x 75	27,769	61,425	61,425	61,425	61,425	273,469
Spot Cooler Rental	14,000	10,000	-	-	-	24,000
Generator Back-Up Rental	53,011	90,876	90,876	90,876	90,876	416,515
<b>P&amp;L IMPACT/ inflow</b>	<b>76,043</b>	<b>132,955</b>	<b>122,955</b>	<b>105,115</b>	<b>97,804</b>	<b>534,871</b>
<b>TOTAL CASH FLOW</b>						
Total Outflows/Investment	(1,019,622)	1,189,105	785,845	850,435	215,300	2,021,064
Total Inflows/ P & L impact	76,043	132,955	122,955	105,115	97,804	534,871
<b>TOTAL Cash inflow(outflow)</b>	<b>(943,578)</b>	<b>1,322,060</b>	<b>908,800</b>	<b>955,550</b>	<b>313,104</b>	<b>2,555,935</b>
Cumulative inflow(outflow)	(943,578)	378,481	1,287,281	2,242,831	2,555,935	
<b>TOTAL CASH FLOW - DISCOUNTED</b>						
Total Outflows - discounted	(1,046,671)	1,002,642	605,105	584,721	133,336	1,279,133
Total Inflows - discounted	63,511	111,389	92,428	70,929	59,352	397,609
<b>Discounted TOTAL cash flow</b>	<b>(983,160)</b>	<b>1,114,032</b>	<b>697,532</b>	<b>655,650</b>	<b>192,688</b>	<b>1,676,742</b>
Cumulative inflow(outflow) - Discounted	(983,160)	130,871	828,404	1,484,054	1,676,742	



# 5-Year Costs: Physical vs. VDI

Unit	Physical	Virtual	Savings
<b>PCs (400 @ \$700 every 4 yrs)</b>	\$ 384,500	-	\$ 384,500
<b>Laptops (100 @ \$1,100 every 3 yrs)</b>	\$ 191,833	-	\$ 191,833
<b>Electricity</b>	\$ 10,296	\$ 1,144	\$ 9,152
<b>Purchasing Panos as PCs die</b>		\$ 144,000	< 144,000>
SNS on VMware View (75% concurrency)		\$ 89,600	< 89,600>
SNS on Panos		\$ 60,000	< 60,000>
Refreshing VDI Hosts		\$ 60,000	< 60,000>
IT Admin Costs	\$ 625,000	\$ 260,000	\$ 365,000
Backup license costs	\$ 72,500		\$ 72,500
<b>Total</b>	<b>\$1,284,129</b>	<b>\$ 618,744</b>	<b>\$ 665,385</b>

# Sample VDI Investment

Unit	Cost
VDI Licenses	\$115,000
Storage	\$ 50,000
Host Costs	\$ 60,000
Services/Training	\$ 65,000
<b>Total</b>	<b>\$ 290,000 vs. savings of \$665K</b>

ROI=129% over 5 years. 26 month payback



# Additional Resources

You can find additional information about the topics and products covered in this session at the following links:

- [Vmware.com](http://Vmware.com)
- [Cisco.com](http://Cisco.com)
- [Inxi.com](http://Inxi.com)

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