Memo: October 10th, 2019

To: Jay Thunder, MHS Network Admin
Fr: The Boss
Re: New Office & Warehouse for DMLH's Fulfillment Center for Music Historical Society & others

What's Up

Jay, a lot's been going on with the MHS and our competitors. The board wanted to keep this close during negotiations, which are complete. Now, we're ready to move our inventory, and our failed competitors' inventory, to a new fulfillment center in River City and ask you to get the orders together for the network down there and set aside time to travel and get it up and running for us.

We expect to take occupancy of this warehouse, which will be swept clean, by December 1st, then get it wired and the generator and a/c installed asap. The electrical and a/c is promised complete by November the 20th. You can set to work then to setup the LAN so we can start moving in and accepting shipments and stocking on or about the December 26th, in the lull after the holidays.

Plan the offices and diagram them with Suzy Smiley who will putting the orders together for desks, furnishing the break room, and telephones.

Background

Disc Media's Last Hoorah is the newly re-monikered for-profit counter-part for The Music Historical Society, which is a 501C3 not-for-profit operating as a fiduciary trust for the archives and collections of all kinds that have to do with the history of music. DMLH is quadrupling its warehouse space to take on inventory and customers from competitors and societies arranged around instruments like piano, organ, renaissance horns, strings, brass, and others who are leaving the music distribution and retail business, and have accepted our most favorable offers to salvage their inventory and accounts yet keep their goods available for lovers of their genre.

Soon, we'll have a detailed history of purchases by a couple million aficionados and musicians of almost all kinds of instruments and music all over the world, except contemporary pop, country, rock, &c. DMLH will continue to sell sheet music and scores, books, CDs, and DVDs and will expand its inventory of cassette and reel-to-reel tapes, plus add vinyl LPs back to the warehouse a couple decades after we abandoned them.

Symphonic, chamber, organ, vocal, and choral music recorded in large halls, churches, chambers, and other venues doesn't sound as good on digital media and we expect a decade or more of good sales in LP and tape along with CDs and DVDs. Audiophiles and professional musicians prefer analog recordings on vinyl or tape so we're adding these back to our extensive selection of CD and DVD from more than 300 suppliers in almost every country where music has a history.

From the new location we will fulfill on-line, mail, and telephone orders for MHS and the several other organizations whose inventory we carry. We will be stocking 12,000 CD/DVD titles, about 6,000 titles for sheet music & orchestral scores, and about 2,200 titles in vinyl and tape. Digital distribution rights have not been negotiated for nearly 90% of our titles, so as long as paper, disk, tape, and vinyl are desirable by musicians and music lovers we will carry on...

MHS will keep our present production facility and offices for staff and editor in Yankee Neck, move the Executive Director to the new warehouse, repurpose the old, inadequate warehouse, and move all our inventory to the new office/warehouse in River City. After setting it up, you'll admin and monitor it remotely. The network room won't need a desk, only the rack equipment, UPS, and VOIP/PBX and a table for a work area when needed. It will remain locked unless you request the manager to open it if hands-on are needed.

New Warehouse

The new warehouse is a 100' deep and 68' wide in a large warehouse building with a front entrance through a brick facade and the rear opening to a 16' deep, sheltered loading dock.

This block of fifteen large warehouses was built in the 1920's to support manufacturing and shipping from the nearby and long-abandoned ship and train terminals that are being renovated and refit for residential, retail, restaurants, offices, and data centers. These are handsome brick buildings with adequate parking in the front and alongside for crew and walk-in customers and easy access for trucks of all sizes. We expect more walk-in trade since we'll be in a better neighborhood than our old warehouse and River City has hundreds of members of MHS and other organizations we'll be working with.

The shelving units left behind by the prior tenant are ideal for our purposes. The prior tenant was an industrial parts distributor with a mix of mostly small parts, a few large parts handled on pallets, and lots of trade goods in cartons.

The larger area is made up of shelving units 18 inches deep and 4 feet wide, back to back, with a 4 foot aisle between them. These shelves have 11 inches of vertical clearance, and the units are 8 feet tall. The side wall at the end of the stand-alone shelving units has a solid wall of 18' deep shelves that have 17' clearance. There are three rolling stair units for access to higher shelves and over-stock kept on upper shelves and on top of the units near the manufacturer's items in stock-keeping sequence.

The smaller area at the rear of the warehouse was for palletized items and it fits our bins for sheet music and LPs. It has shelves that are 4 feet deep and wide, with the alley 6 feet wide to accommodate palletized items and a forklift or pallet jack, bolted together side-by-side, very sturdy. They have four feet of clearance on the floor under the first shelf, a shelf with 4 feet clear, and a top shelf.

Floor Plan & Rack Layout Sketches

Here is a sketch of the **Floor Plan** for the offices and warehouse.

Here is a sketch of the **Rack Layout** with the IP addressing scheme NPONet expects.

These are both right rough sketches but they're likely accurate since I'm fresh from meetings. Please get them cleaned up and ready for NPONet to approve, and installers to use.

NPONet Application Software and Support

NPONet will be facilitating the launch of the network at our new fulfillment center. We met with Guy Shick from NPONet today and arrived at a purchase price of $43,000 for their NPONet software package, 12 user license, & installation of firewall software. Annual maintenance will be 12% of that.

Also, we agreed on a price of $9,000 for them to do the conversion and take-on of items, customer accounts, and order history from our failed competitors' and other suppliers' databases. NPONet will also work to scrape our current inventory from the pages of our Yahoo store so we can abandon it. With the sales from our new warehouse, we would be paying Yahoo more than $120,000 a year if we continued with them, so this will cover costs for the NPONet software and network.

NPONet will maintain a hotsite for us and handle remote transaction logging at their secure facility for $200 per month in addition to the 12% annual maintenance fee. Please get a PO together for NPONet: 11210 Rose Hill Rd; Phantomia, MA 09129.

Electrical Service & A/C

NPONet discovered on their site visit that there are three ground circuits in the warehouse space and one is not working at all. We'll need to remedy that since it would fry our LAN for sure.

Also, we're getting a natural gas generator to provide as much up-time as we can afford at our location, where there is a history of momentary power fluctuations and outages a few times a year.

We've engaged River City Environmental, 17 Argyle Court, River City, VG 23285 to do this work. They've agreed on: $8,200 for a 22KW natural gas generator and its ATS installed near the power and DMARC shed on the shipping dock; $4,750 to install a new ground stake at the shipping dock face, a new meter and main panel, and tie all our electrical outlets to it; $5,000 to install the new dual zone air-conditioning and get vents working in toilets, network room, and kitchen; and $1,000 to add four 20amp circuits to the network room and up to ten more outlets where they may be needed in the offices or warehouse.

Personal Computers

We need several 'low powered' PCs for desks and benches, and one beefed up workstation for Advertising/Publishing.

Find a deal on 'low powered' PCs mentioned below, which don't need to be super-powerful and dual-core Celeron, early Core, or AMD will work. Get at least 8 Gigs of RAM. Splurge on larger HD monitors for the front-office if you'd like. See specs below for the workstation.

Network Room

The network room must be physically secured and rigged with a secure DMZ firewalling scheme for the LAN and secured server network. We need to meet and exceed PCI standards for security and privacy since we're the custodian of customers' payment card data. Please get a PO together for PCI Compliance, Inc; 10000 N. Boston Rd; Farmington, Mass 09876. They will provide initial audit and their monitoring software and services for $2,000 to start, plus $400 in advance for the first year's services and $400 per year after the first.

Find a network rack with power management built-in, or put one together. It needs a rack-mounted ATS and two UPSs at least 2.5KVA.

We need 4 identical x86-64 servers, AMD or Intel, each with at least three ethernet interfaces and a pair of 1 TByte SAS disks mirrored in a RAID 1. These will be rigged as: DMZ firewall/router/proxy, secure application & web server, database server, and a backup server that stays in synch with the other servers and can replace any of the other four machines if/when needed. See the attached sketch for the rack layout and jumpering.

All four machines need RHE licenses and will be managed using RedHat's on-line utilities. along with other MHS servers. Two of the $349/per two socket versions will suffice if you get single-socket servers for the rack. Get a PO together for this please, and plan to renew them yearly.

NPONet provides remote hot-site and remote transaction logging as part of their on-going service agreement, as mentioned above.

We'll do full-backups on weekends and incremental backups and dump local transaction logs to LTO tape nightly.

Get two rack-mounted LTO tape drives and 200 smaller capacity LTO tapes similar to HP C7975A LTO Ultrium 5 (1.5/3.0 TB) or Maxell 183906 10-Pack LTO Ultrium 4 Tape Cartridge LTO-4 800GB/1.6TB. See if you can find a source for less than $20 per tape. Get a set of tape labels. One drive will backup the advertising computer and the other will get the application, database, and DMZ servers. NPONet will check a tape for readability monthly, so plan to do that. The manager and other employees will be loading and labelling tapes, monitored automatically by in the system health checks.

United Security Vaults will pick up and drop off tapes on weekdays for $350 per month for up to 300 tapes. They'll put them in their tape storage robot and make them available for secure, near-line access for routine audits and system health checks.

A VOIP/PBX Controller, all the phones, and the secretary's phone console are already on order from Rochester Alarms on the office budget, so you don't need to issue a PO for this. The VOIP controller will be hung on the wall near the network rack and it's VOIP port connected to the LAN switch's uplink port.

The Internet port on the VOIP Controller is connected to the DMZ/Proxy's ethernet port 0.

We'll start off with the two T3s, one for pure data by VOCAD/GigaPath for $350/mo and the other from Cavalier provisioned for their VOIP service for $775. The Cavalier contract includes unlimited long-distance and local calling through their SIP service to complement our VOIP controller. The T3s come to the DMARC in a utility shed built onto the shipping dock adjacent to ours, and they enter the DMARC shed from opposite ends of the warehouse block to help ensure redundancy if a circuit is cut.

Wireless Access Point for Inventory Cart ∓ Employees' Devices: Get a separate DSL circuit and wireless modem from Verizon to support the inventory cart and employee's phones. We don't want WiFi attached to our network at all since any PC is likely to be used for customers' credit cards and personal information. The inventory notebook and employees will be using VPN to access NPONet securely. We are close enough to the telco switch that we can get 15 MBytes bandwidth for $89 per month and neighbors report good service. Wire the DSL Modem/WAP directly to the NID in the DMARC shed. Set the WAP's firewall to only handle established connections and add the MAC addresses of employee's devices to the access control list.

Get nice, _managed_, rack-mountable 10/100/1Gig switches with uplink ports for the LAN and DMZ. Get both the same, or select from a line like NetGear that has the same manager's interface on switches from 8-port through 32.

Three IP networks are involved: We have a block of 6 fixed, public IP addresses on the 162.243.30 subnet from 71.121.19.9 through 162.243.19.15. 19.9 is for the gateway router in the VOIP controller, and 19.10 is for the DMZ/Proxy's port 0. The others may be used in the future. The LAN for the office will run on 192.168.1 with .1 as the router/gateway. Assign office machines starting with 192.168.1.100. The secured LAN for servers is 10.0.1 with 10.0.1.1 as the gateway for that cluster of machines: The DBMS server is at 10.0.1.10, App server is at 1.11, and Backup is 1.12.

Ethernet/IP Assignments:

- DMZ/Proxy:
    - eth0--71.129.19.10 is our public IP, associated with our DMLH web and mail servers, connects to the Internet port on the VOIP controller, which serves as the gateway at our border and will be configured with IP as 71.129.19.9.
    - eth1--192.168.1.1 will attach to the LAN switch for the office & warehouse, will be used as the gateway for these machines.
    - eth2--10.0.1.1 will attach to the uplink port on the 'secure switch' for the network for app, database and backup servers.
- Database server eth0: 10.0.1.10
- App/Web server eth0: 10.0.1.11
- Backup server eth0: 10.0.1.12

Disable DHCP and assign static IP addresses in the warehouse and offices starting at 192.168.1.100. Record the MAC addresses as you set up the machines, to loaded into the DMZ's access control list.

NPONet's Shick will be in touch with you as you set up and prove the firewall, proxy, and VPN. Send him a copy of the floorplan and rack diagram so they he and his crew can advise and consent about the network, in which they'll share administration and audit.

When the installation is complete get in touch with PCICompliancers.com so they can audit as we start up.

Receiving

The receiving bench needs a low-powered PC, a portable barcode scanner, and a barcode printer to print barcode labels for the several items that arrive with no barcode. NPONet asks us to use Zebras for barcode printers for compatibility with their label-printing features.

The receiving bench shelves are filled with environmentally-friendly plastic jackets for items we don't want to mar with a barcode label.

An HP or Lexmark B/W Laser needs to be attached to the network on the end of the receiving bench for printing receivers, inventory count sheets, and other paperwork. It will be used as a backup printer for picking lists if needed.

Shipping

There is a two-foot wide shelf over the shipping desk where the printers will be placed. The shipping bench needs four low-powered Windows PCs, Celeron or Duron or cheap dual-core is OK, with 4 or 8 GBytes of RAM. They should all have serial, ethernet and multiple USB-2 ports to be compatible with printers and scanners, they'll all run Windows:

- One will act as 'the shipping computer' and connect to the scale, mailing machine, and label printers. It needs to run on two-port KVM switch with the Shipping 1 computer. It may be placed on a shelf below the shipping bench. It will run UPS ConnectShip and FedEx Ship Manager for orders where the customer requests UPS or FedEx so fulfillment crew will rarely use it directly. It serves as the printer-driver for the two 4" thermal printers for 4X7 UPS and FedEx labels. One thermal printer loaded with 2 X 4 labels for USPS will be the most used, with postage printed by the Pitney-Bowes mailer.
- The shipping computer makes the current scale reading available via the LAN and is integrated with NPONet's app so USPS labels and postage are printed automatically when the ACH authorizes payment.
- Three low-powered PCs with barcode scanners for each of the 6-foot work areas on the shipping bench. Usually there are one or two picking and shipping, the 3rd work is for rushes.
- The USB label printers and scale will be moved from our existing warehouse.
- The Pitney-Bowes mailing machine needs an ethernet jack, too. We will be moving our current machine to the new warehouse.
- A b/w laser printer for printing picking lists.

Our rather conservative board insists, probably wisely, on a piece of paper being printed for every movement of inventory. These are archived face-down, in rough date sequence, in storage boxes, sampled by auditors, and taken off-site periodically.

Inventory Cart

The cart in the warehouse will be used most days for inventory management, cycle counts, and putting up stock. It needs a big notebook computer with a numeric keypad, a USB barcode scanner, and a USB Zebra barcode printer.

Find a built-for-purpose cart with a big battery power supply that will keep it running for an 8-hour shift.

To connect it to the network, place the Verizon DSL/WiFi in the ceiling at the center of the warehouse. Connect it directly to the DSL circuit in the DMARC room adjacent to our space.

The cart will be used daily for cycle-counts and can serve as another receiving station when there are a lot of shipments.

Front Offices and Secretary

In the ED's offices, Sales, and Secretary's desk we need desktop PCs running Windows, low-end please, not much power needed, large, HD LCD panels will be nice, 24-inches or larger. The manager and secretary each need a multi-function ink-jet printer with scanner to handle correspondence and local printing. Budget 4 sets of ink-jet cartridges per year for each of these printers.

A VOIP Fax goes on the workbench for customers and suppliers who still use fax.

Advertising/Publishing

The Advertising/Publishing desk needs special equipment to handle graphics for print and web. Get a nice, big, fast

Workstation with two CPU sockets and two very quick 8+ core CPUs plus dual graphics cards. 32 Gigs of RAM + a pair of 30-inch ultra hi def monitors.

Find an 11X17 Epson EcoTank for proofing adverts & booklets. Add an 11X17 scanner, or find an all-in-one like the ET-16500.

Get the pro versions of PhotoShop, Premier, and Quark Express.

Purchase a UPS, 300VA or better, for each PC, and a couple of big ones of 1500 VA or better in the computer room for the servers and the network equipment. Budget to replace the batteries in each UPS every year. This warehouse has relatively 'dirty' power, but the neighborhood very rarely has power out, only once or twice a year in recent years.

The machine labeled 'big color laser/binder' in the front office needs to be a color laser that can handle several paper bins, at least two 11X17 and two 8 1/2X11. It needs a finishing/binding attachment that can staple at the corner, edge, or center of 11X17 pages so we can print covers & contents for 8 1/2 X 11 catalogs or booklets and direct mail pieces.

Budget for the toner to print approx 6,000 pages per month. These will be small batches for the customers who we've discovered or suspect like mailed pieces better than email.

Many of the customers we'll be serving do not use The Internet (folks who play instruments 300-years old resist such innovations) so we'll be preparing customized catalogs for them at least quarterly, a mix of graphics and text. We have had and expect continued excellent response from these, where the failed competitors have ignored this market segment for some years.

Premises Wiring

The old network wiring doesn't go to our network room, and will be scrapped.

We're using VOIP phones, so each phone is plugged into the LAN and the PC is plugged into the phone. Shipping and receiving stations each get one jack, plus a jack for the shipping computer and the serial label printer attached to the LAN for the application server.

Bubba's Networking quoted a low $40 a drop plus $100 for the service call for the premises wiring since the building is easy to wire, mostly exposed to the 14' ceiling in the warehouse area, with a ceiling dropped in over the office at 9'. Bubba's will supply a patch panel and they will provide the CAT6 cabling and wall jacks.

Get enough jumpers to plug in all the Phones/PCs, printers.

The Manager, Secretary, and Ad desks in front office need two pairs of jacks each. Take care to place desks and jacks so that no jumpers are pulled across the floor or require long runs along the baseboard. The Sales desk only needs one jack.

Make sure to show the location of each wall jack with a Telecomm outlet symbol so your diagram can be handed to We Be Wiring when they show up to install the premises wiring. In all places, take care to put the jacks where there will be no jumper pulled across the floor..

Purchasing Docs, Rack Diagram, Floorplan

Please get good-looking documents together from these rough sketches and words. Use Visio to make a clear and accurate floorplan with the telecomm symbol at each LAN jack and drop wires. Make a separate detailed rack diagram that clearly shows the rack, servers, VOIP, patch panel and switches, and how the ethernet ports are addressed and jumpered.

Make a _purchase order for each supplier_ so I can get them signed off.

On a separate report show a line item for each supplier with the up front purchase costs and a total. In another section of the report, show the budget for annual operations. Set aside 12% of the purchase price for maintenance if it's not included in the purchase price, and include it in the annual operations. Do not mix purchase and maintenance!

If I've been unclear in any way, please get your questions asked and answered.