White paper

Battery in a TAP?

How a backup plan will back fire

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Abstract

This paper is a review of a dangerous and unnecessary recent series of events to place electronically unattended batteries in network monitoring devices. This paper also covers the dangers that batteries can bring when left unattended in any device. All professionals need to consider these dangers especially when it applies to networks and employees. There is no reason to have batteries in network access devices and further they can create very hazardous conditions. Every network professional needs to read about these dangers and how they should be avoided at all costs.

I love innovation but this innovation creates dangers to the physical network and employees.

No electronically unattended or unmonitored battery should ever appear in your network and especially one that does not have any real technological value.

Putting a Fire Hazard, an overall dangerous potential hazard in my Network?

There is a new trend of putting batteries in network access devices that I am really not sure of, so here are my thoughts as well as some very sobering and REAL documented concerns.

First let's talk about the reality of batteries, especially Li-ion:

> They need a charge cycle thus a charge and discharge circuit.
>> -This is very important. As no charging or overcharging can cause a rupture, fire, etc.
>> -You cannot just let a battery (Lithium, NiCd or NiMH) just sit in a device without failure.

> You need some notification of the condition of the batteries charge state.

> You need to know that it needs replacing or a serious rupture and/or fire can occur.
>> -If it ruptures you can have serious caustic situation in the air and in the chemical spill

> The older a battery gets the higher potential for a failure and rupture
>> -United States Consumer Product Safety Commission (CPSC)
>>> -When burning, a battery/cell can reach temperatures of 700C+
>>>> • That will easily burn through aluminum and almost anything else
>>>> • During and after burning there will be not only hazardous/poisonous gasses but a dangerous caustic spill.

The National Renewal Energy Laboratories say - If a battery is left to sit without any care it can easily rupture and catastrophic results may occur, such as: first-, second-, and third-degree burns, respiratory problems, fires, explosions, and even death if in contact for long periods. When ruptured a battery gives off gases like hydrofluoric acid, hexafluoroarsenate (that is an arsenic salt), cadmium, hazardous metal fumes of nickel, cobalt, aluminum and manganese; hydrogen gas, caustic vapors of potassium and sodium hydroxide, all are very deadly, toxic and caustic. Any battery rupture and associated spill can easily eat through electronic circuits and aluminum and all types can rupture dangerously if short circuited from internal degradation or external contact. Improper charge cycling, which is very limited for all batteries types, is the second most common cause of rupture next to aging.

Most Fire Marshalls suggest that they are especially dangerous fire hazards if just sitting in a non-active circuit.

The recent Boeing plane fires were caused by Li-Ion battery Improper charge cycle causing ruptured cells and fire! Were they monitored for thermal runaway, are yours? Thermal runaway occurs in ALL battery types! Battery fires can easily reach 700+° C or 1300+° F. Aluminum starts melting around 600°C.

Do you want this in your network, endangering everything?

All batteries consist of a cathode, an anode, and an electrolyte that separates the two electrically but allows the transport of ions (electrical charge carrying atoms). There are at least 6 different versions of Lithium-ion batteries then you have NiCd, NiMH and lead acid types. All batteries are sensitive to heat, moisture, charge state and pressure.

Battery based items would not be allowed in any NEBS (National Energy Barometer Survey) environment because of the fire and caustic potentials but all NEBs labs have full power backup as with most professional networks, so batteries are not needed. Most insurers will also have issues with the potential hazard and it may violate the conditions of liability, bringing a hazard like this into a network and business area.

The International Air Transport Association, the Maritime Transport Association, Federal Express, UPS, NTSB, IATA and all transport carries now consider batteries as Dangerous and Hazardous Goods. As of January 2012 there are new restrictions on battery transport. Many airlines are considering restrictions on carry on batteries after all the recent fires and the potential of using batteries in an air terrorist attack.

Ok now we know of the dangers, let's talk about the reality or viability of needing a battery in a TAP.

There are much more reliable ways to keep monitoring your network in times of power failure. Here are the better methods and comments:

Dual power planes with two separate power sources hooked up to separate power sources. One is hooked by your normal power and the second supply is hooked to your network power backup – a UPS, Generator, etc.
- All professional networks have a power back up system.

> If your network is not up and running, you have much bigger problems than monitoring a downed network.

> Hook up the network and all tools to a Real UPS for a single plane network power. One power supply hooked to your main power and hopefully a backup solution.

> Usually if you lose power in your network the users have lost all power so a basic plan is to have enough power to gracefully shut down your servers and network instead of just a crash! You will not need monitoring access for this.

> If your analyzer, management, SIEM, etc. equipment are without power you do not need to worry if the TAP is alive.

> Plus any battery power in the TAP will not last very long and once the batteries are discharged what do you do, throw away the TAP?

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TAPs are meant to be one time installation devices to monitor your real and total packet flow. If you are using a mobile TAP, then go powerless but do not keep taking down the network.

Most high quality, professional grade TAPs have power failsafe and do not need any power source or they have a backup AC source.

Be smart use real TAPs, hook them up to you back-up power source and do not expose your network to a potentially dangerous situation and cause another fault point in the network.

I have one other concern, how would you even test to see if the battery works and for how long? There is no alert/alarm if the battery is failing and if you tested it, the battery it could die on you during the test and diminish the charge. What happens then? Do you send it back for another battery or even worse have to take it apart and out of the network to replace the battery?

Remember the motto "Do not trust them, test them!"

Review – Even well cared for batteries are a hazard, but ones that have no real electronic support or level management are potential hazards to people and equipment, thus they should NOT be in a network.

As the saying goes "get professional or go home."

To learn more about dual power planes and other approved network connectivity strategies, **contact the experts at Garland Technology.**

Garland Technology is all about connections – connecting your network to your appliance, connecting your data to your IT team, and reconnecting you to your core business. It's all about better network design. Choose from a full line of access products: a network TAP that supports aggregation, regeneration, bypass and breakout modes; packet brokering products; and cables and pluggables. We want to help you avoid introducing additional software, points of failure and bulk into your network. Garland's hardware solutions let you **see every bit, byte, and packet**[®] in your network.

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