

Green is in - harvesting the intelligent network

by Raghav Sahgal, Vice President, Asia Pacific & Japan, Oracle Communications

The ICT sector uses vast, rapidly growing, amounts of energy and contributes significantly to carbon emissions and global warming. Legislation, costs, competitive and ethical pressures are all driving communications service providers to adopt Environment Impact Reduction (EIR) programmes and cut their CO2 emissions. New, more efficient equipment, better network planning and management and specialised network intelligence software are all important elements in the fight to reduce emissions that contribute to global warming. Fortunately, many green solutions reduce energy usage and costs.



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Cutting CO2 emissions is a crucial to the fight against global warming, and the need is particularly acute in the ICT sector, which produces an estimated two per cent of the world's CO2 emissions - equivalent to the aviation industry's carbon output. New cyber-infrastructures, Internet and mobile applications are growing faster than any other sector.

If the world's mobile network operators upgrade their infrastructure with more energy-efficient equipment, they can reduce the industry's emissions by 42 per cent by 2013, according to a new study by Pike Research entitled Green Telecom Networks.

The GSMA launched its Green Manifesto for the Mobile Industry in November 2009. The Green Manifesto is especially pertinent within the Asia Pacific region, the world's largest mobile market, which should have more than three billion connections by 2013. Rob Conway, CEO and Member

of the GSMA Board, said, "The mobile industry could enable greenhouse gas emission reductions of 1,150 Mt3 of CO2 in 2020 - twice the present emissions of the United Kingdom. We will be calling upon governments at COP15 to ensure that mobile solutions are at the forefront of the global fight to prevent climate change and mitigate its consequences." Ethics, legislation and cost can help bring about this shift, and network intelligence offers the capabilities needed to achieve an eco-friendly communications sector.

Drivers for change

Most CO2 reduction activity has focussed upon private consumer for some time. It was only recently that the airline industry became a target for 'carbon activists' and airlines raced to create Environmental Impact Reduction (EIR) programs and carbon offset funding channels. Now the focus is shifting to the ICT industry as it currently produces the

same amount of CO2 as the airline industry and, with the projected growth in 'smart client' access devices and applications, will outstrip this consumption in the coming years.

Legislation

Many countries agreed to the aggressive reduction in carbon emissions called for by the Kyoto Protocol. This resulted in a variety of taxes and laws that force industries to change their business practices and resource consumption.

Ecotaxes (*ecological taxation*) or Green Taxes are taxes intended to promote ecologically sustainable activities via economic incentives - often with the intent to make the parties involved feel the social burden of their actions.

In communications, BT Conferencing entered into an agreement with CO2Neutralconferencing.com, a carbon-

neutral conferencing provider, to provide carbon-neutral conferencing services in Asia Pacific. The collaboration will provide conferencing services that will be offset by carbon credits. BT has also invested in solar, wind, renewable energy deployments at their equipment sites, and alternative transport fuels usage, to generate carbon offsets.

Costs

Electricity usage has increased dramatically and is set to continue. Nuclear power, solar and wind power - despite 'zero-rated' tax incentives in some countries - are still not widely adopted power sources. In the UK, for instance, the Climate Change Levy (CCL) component is currently five per cent, and this will rise with inflation. Electricity costs are expected to rise 27 per cent by 2015 and 65 per cent by 2020.

Two types of migration are taking place in the communications industry, which will affect power costs. First, a migration of core legacy technology to a more IP-based 'super-node' network with reduction of core nodes will take place in the next several years. These 'hybrid' technology networks with co-located equipments are, for the most part, inefficient, and need more power. The second migration, that of user services to multimedia and applications based access, will utilise lower cost 'smart client' devices like the iPhone and netbooks. Given the greater bandwidths involved, power demands for network access and aggregation layers will increase unless ways are found to control energy needs.

Network intelligence

It is estimated that although half of all data centres today have insufficient power and cooling, energy costs have, nevertheless, become the second highest data centre cost. By 2010, at more than half of the data centres the power consumed by IT equipment, together with that consumed by cooling equipment, electrical system inefficiencies and lighting will account for 50 per cent of the total costs.

Network intelligence tools can improve energy efficiency and deliver significant generic cost savings and to service providers. Major advantages of network intelligence tool adoption can include:

Route optimization - Although many operators would like to operate at 80-85 per cent network utilization, most are operating at 50-65 per cent utilisation. This means 35-50 per cent of the network elements are consuming power and generating

operating expense without delivering value or generating revenue. Network intelligence provides the tools for capacity management, to optimise plans within desired thresholds, to identify demand growth trends and to spot potential stress points and threats to the network. Through its visualisation of network elements and routing capabilities, network intelligence can effectively improve network utilisation levels. The re-routing of elements and freeing up of assets can provide additional 10-15 per cent revenue-generating capacity with no additional power costs or carbon emissions.

Spare inventory optimization - Network intelligence tools can visualize, optimize and estimate the dates current spare part stocks will be exhausted. This allows the service provider to reduce inventories, and carrying costs, of network spares. Some optical equipment has a six month wait for delivery, so - since service providers cannot currently calculate their needs with any degree of confidence - they tend to overstock spares to guarantee they will have parts on hand when outages occur.

Optimal planning - Network intelligence makes possible sophisticated planning features that can consolidate forecasts of route service demands and compare this with existing network capacity to establish what it can optimally accommodate and determine the minimum additional network capacity required. This minimises the building of unnecessary network infrastructure compared to traditional manual planning methods, reduces both capital and operating expenses and reduces network power consumption. A UK operator recently forecast transmission network savings of £500,000 during the next 12 months in electricity alone.

Card optimization - Network intelligence tools help service providers optimise DSLAM (*Digital Subscriber Line Access Multiplexer*) card banks by redistributing traffic to maximise card utilisation, free up valuable cards and reduce power consumption. Customer traffic can also be 'cleaned up' to better match end port bandwidth rates and wholesale and retail customers can be better segmented and managed technically to provide better service. Typically, providers can free five per cent to ten per cent of their cards and redeploy them or remove them to reduce power use.

What-if modelling - Service provider planning departments would often like to model 'what-if' situations to evaluate the probable impact of initiatives to replace existing technologies with newer, better,

products. What, for instance, will be the impact on the existing network and on new build requirements if data services grow by 25 per cent over the next 12 months? Will the network will be able to accommodate this growth? Network intelligence lets service providers to conduct such what-if analyses and assess the network impact and resultant power requirements.

Consolidation/migration - A service provider may need to consolidate nodes or multiple locations in an area. This could be because of an acquisition, for network rationalise its network, migration to new IP-based architectures, moving traffic or legacy equipment from one location to another or for equipment upgrades. Network intelligence tools simplify this task by generating circuit de-commissioning plans, aggregating the circuit traffic to form a routing demand forecast and then bulk routing it onto the existing network as if it were a demand forecast for planning purposes. This results in significant operational cost and power savings. In addition, coupling network intelligence with asset management or ERP systems can give operators the ability to manage their network asset lifecycle holistically.

Outages - How a service provider reacts to unscheduled outages and how quickly they can identify and notify the affected customers and restore service is critically important to minimise revenue loss, customer churn and carbon costs. Network intelligence tools can quickly model an outage and a 'routing engine' can identify restoration paths for the affected circuits. These tools can minimise the impact of an outage and pro-actively customers notify customers of the outage. Service can be restored more rapidly, reducing downtime and, by dispatching engineers directly to the correct locations, carbon emissions will also be reduced.

Communications service providers need to adopt Environment Impact Reduction (EIR) programmes - either because of government legislation, costs or because of competitive and ethical pressures. Some immediate steps could include: equipment replacement programmes to implement lower energy technologies; migration from current power supply infrastructure to low, or zero, carbon impact technologies; and deployment of network intelligence software to quickly optimise the network, reduce power and HVAC (*heating, ventilation, and air-conditioning*) consumption and lower carbon emissions. ●