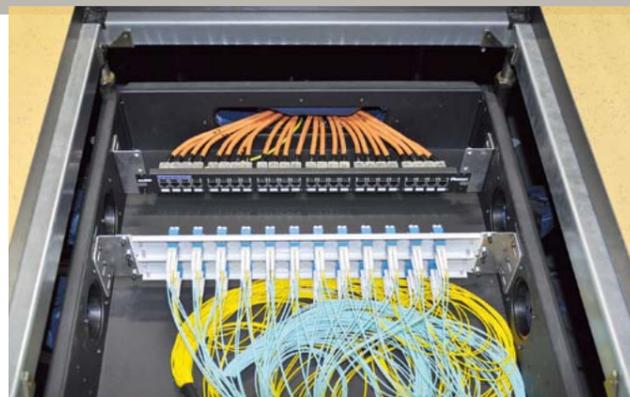# 凯泽斯劳滕工程技术公司(TWK)数据中心的快速安装

High-speed installation in data centre of Technische Werke Kaiserslautern

TWK-IT 在数据中心场所中预留了几个集合点，以适合未来应用。

For future applications TWK-IT holds several consolidation points in reserve on data centre premises.

安全、高实用性和高能效：这些都是TWK(凯泽斯劳滕工程技术)公司对其新数据中心的核心要求。经济的德特威勒布线系统为布线系统快速连接提供了保证，仅在三周内就完成了安装。

Security, high availability and energy efficiency: these are the key requirements of TWK Technische Werke Kaiserslautern for its new datacenter. High-speed connections are guaranteed by an economical Datwyler cabling system, which was installed in only three weeks.

自1991年以来，TWK一直作为能源方面的区域服务供应商、水供应商以及公交运营商而表现活跃，从2000年开始，成为公用事业和废物管理公司的IT和TC外包合作伙伴。自2010年9月以来，TWK一直为外部公司提供广泛的ITC服务，其中包括服务器托管和维护、网络和应用托管以及网络基础设施规划、网络和数据安全等。这一切通过欧洲最先进和最安全的数据中心"Datacenter4you"的建立而成为可能。

Since 1991 TWK has been active as a regional service provider for energy, a water supplier and a bus operator and, from 2000, as an IT and TC outsourcing partner for utilities and waste management firms. Since September 2010 TWK has also been providing companies outside the sector with a broad spectrum of ITC services, among them server hosting and administration, web and application hosting as well as infrastructure concepts for networks, Internet and data safety. This was made possible by the construction of "Datacenter4you", one of Europe's most modern and secure data centres.

在六个月内，两个相互独立的占地约420平米，设计容量为1.6兆瓦的服务器机房在1500平米的建筑工地上拔地而起。这些都是德国威图公司提供的经过模块化ECB.S认证的Lampertz高安全机房。它们目前可容纳14排封装机架，共计160台服务器机柜，通过活动地板和制冷通道等方式提供冷空气——全年自然冷却约占80%。

Within six months two autonomous server rooms with around 420 square metres of floor space and a design capacity of 1.6 megawatts were erected on a 1500 square metre building site. These were modular ECB.S-certified Lampertz high security rooms from Rittal. They currently accommodate 14 enclosed rows of racks with a total of 160 server cabinets which are supplied with cooling air – over the year around 80% of it free cooling – by way of a raised floor and cold aisles.

BO系统的多芯电缆非常细，以至于48根迷你电缆可以在每个配线架内部进行连接。
The multiple cables of the BO system are so thin that 48 minicables can be connected in each distribution panel.

"全年约80%的时间外部空气足以冷却数据中心，使其保持在20摄氏度——只有在极少数情况下压缩机才会运行。这样可以节约大量电力，我们估计满负载时的电力使用率低于1.3，"TWK总监Berthold Willig说。以前的数据中心作为备份站点而予以保留，IT总监估计当前系统每年将节约4万欧元。目前排出的热量用于为周围的楼宇供暖。随着容量的增大，热回收将有利于附近露天温水泳池的使用。

"Throughout the year for around 80 percent of the time the outside air is enough to cool the data centre to a constant 20 degrees Celsius – only then do the compressors come into operation. This way we save so much electricity that we reckon on a Power Usage Effectiveness of under 1.3 at full load", says Berthold Willig, TWK's IT Director. Compared with the previous data centre, retained as a backup-site, the IT Director estimates that savings made by the existing systems already amount to around 40 000 euros annually. The waste heat is currently being used to heat the surrounding premises. As capacity increases the heat recovery will benefit a nearby open air heated swimming pool.

一个机架单元上容纳的48芯光纤
48 fibres on one rack unit

借助于活动地板，通过冗余光纤和铜缆连接（1G）可以从两个独立的广域网（WAN）进线间连接到服务器。通过与Markus Ryll的密切合作，Avalan公司承接了TWK-IT的新网络施工，在数据中心所处位置，Avalan公司安装了约14公里带有RJ45连接器的7类unilan®7080数据电缆和4500芯、采用德特威勒BO系统技术的光纤。该光纤系统基于带有48根两端预端接LC连接器的FO迷你电缆的紧凑型多芯电缆（主线路）。由于主线缆的外径只有1.84厘米，因此在机架中，单元配线架上的每根多芯电缆都可以连接到预端接的LCD接头上。

The servers are accessed from two separate WAN rooms by redundant fibre optic and copper connections (1 gigabit) via the raised floor. In close collaboration with Markus Ryll, responsible for the new network at TWK-IT, on the data centre premises Avalan installed around 14 kilometres of Category 7 uninet® 7080 data cable with RJ45 connectors and 4500 fibre optic connections with the Datwyler BreakOut System (BO System). This fibre optic system is based on compact multiple cables (trunks) with 48 FO mini cables which are prefabricated with LC connectors at both ends. As the external diameter of the trunks is only 1.84 centimetres, in the rack rows each multiple cable in a 1 U distribution panel can be connected to pre-assembled LCD couplings.

经济的解决方案，快速安装
Economic solution, rapid installation

根据Avalan的销售总监Thomas Freis的观点，BO系统比FO系统更经济，安装速度也更快，尤其是在原位拼接中。如果没有预端接BO线缆，就不可能在指定的三周内完成安装。不考虑其他因素，超薄超轻的光纤解决方案最能满足消防要求。

According to Thomas Freis, Avalan's Sales Director, the BO System is far more economical and faster to install than other FO systems, particularly compared with in situ splicing. Without the prefabricated BreakOut cable it would have been impossible to fit into the specified time slot of just under three weeks. If nothing else, the fire protection requirements militated in favour of a very thin, light fibre optic solution.

每根单线上TWK的特殊标签和普通线缆的外护套，实现了简单的文档记录，与配线架的清晰连接。配线架上的线缆接入和应力防护通过M25线缆托架得以实现。电缆分离器在BO系统中总体冗余。单根光纤在配线架中约1.5米的冗余长度使其在服务过程中易于更换FO光纤连接头。

TWK-specific labelling on individual minicables and the common cable sheath allows for simple documentation and clear assignment of the connections in the distribution panels. Cable entries and strain relief in the distribution panel are realised by M25 cable glands. Cable dividers are totally redundant in the BO system. Excess lengths of around 1.5 metres of single fibre cable in the boxes make it easy to replace the FO plug-in connectors during servicing.

2010年年底，TWK-IT仍然忙着移动服务器。日常运作中可以在线执行。"这就意味着我们的客户应用程序，包括SAP、实时视频、档案系统以及网上商店，均保持随时可用"，Berthold Willig解释说。库存系统完全映射和冗余操作，现在安装了6排机架，占据了大约40%的存储空间。

At the end of 2010 TWK-IT was still busy moving the servers. This took place online, during routine operation. "This meant that our customers' applications, including SAP, real-time video, archive systems and online shops, remained available at all times", explained Berthold Willig. The inventory systems, which are fully mirrored and redundantly operated, now fill six rack rows or around 40 percent of the storage space.

IT总监Bertold Willig表示Datacenter4you的高容量性能为未来的产品和功能奠定了良好的基础，包括Smart Metering（智能仪表）和Fibre to the Home（光纤到户）。鉴于在托管和外包领域的商业趋势，TWK预估了最多8年的投资回报（ROI）。

Bertold Willig, IT Director, says that the high capacities of the Datacenter4you form a sound basis for future offerings and functions, including Smart Metering and Fibre to the Home. In view of business trends in the colocation and outsourcing fields, TWK reckons on a ROI of maximum eight years.

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