



High-Speed Internet at School

Gottlieb-Daimler-School implements campus Wi-Fi



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Thorsten Jakob, District Office departmental head

The more than 2000 pupils attending Gottlieb-Daimler-School 1 (GDS1) in Sindelfingen could hardly believe it: just before autumn half-term, the school started up its own Wi-Fi system, which they can access for educational purposes using any personal computing device. The school has set up age-appropriate content filters, of course, but no bandwidth restrictions are in place. The new wireless system opens up a variety of new options for teachers in terms of lesson design. Conetis GmbH realised the entire network using D-Link components, in close cooperation with Dirk Riebesell, GDS1's head of IT.

Diverse educational possibilities

Gottlieb-Daimler-School 1 offers a wide range of subjects and educational courses. The school brings a total of ten different course tracks together under one roof. For Headmaster Holger Esch and the rest of the faculty, a pleasant working atmosphere and future-oriented education are top priorities, which is one reason why school authorities are particularly intrigued by efforts in Baden-Wuerttemberg to encourage the use of tablets in vocational secondary schools, and particularly in dual-track programs at professional schools. Of course, intensive tablet usage in the classroom (32 tablets per class) can place serious demands on the school's wireless and network infrastructure.

Outdated network

Another parallel project involved modernising the school's phone system, originally installed in 1980, to incorporate IP telephony. Here, too, the existing network was experiencing bottleneck issues. The school already had a large, modern network, but it had only a few connections and limited bandwidth (1Gbit/s uplinks), and not all of the existing connections were PoE-ready. The existing Wi-Fi system comprised 30 older-generation (802.11b/g/n) access points, which pupils had selected (and, to an extent, installed and commissioned) as part of a school project in 2007. Though the system was considered cutting-edge ten years ago, it is far from capable of accommodating the needs of modern classrooms using a great deal of online content.

The district is supporting the school in its goals, and has greenlighted its plans to re-cable the building and build a future-oriented campus network. Dirk Riebesell, the project manager in charge, sees this as a truly trend-setting decision: “In cabling projects like these, the biggest challenge is adhering to fire safety codes. As long as the firewalls are being opened up anyway, it's

most efficient to go ahead and scale the network generously.”

Future-oriented planning

As a result, “Project Update Phone System” turned into a complex networking project that required extensive, precise planning to ensure that the school would be equipped for future requirements as well. They wanted to avoid cutting corners in terms of either quality or quantity, although keeping the budget in mind was obviously important as well. A needs analysis concluded that the following items were particularly important:

- Per staff room with 4-6 workstations: 8 network connections
- Per classroom: 4 network connections (one for the access point, one for the projector, and two for computers)
- Cat. 7 copper cabling; building distributor connected to data centre using 10 Gbit/s fibre-optic lines, 2 uplinks per stack
- One distributor per building, with components connected radially
- Existing lines left in place for migration purposes
- Est. 40 access points using AC-Standard - specifics to follow after an illumination test
- Central network switches in each individual building
- Full redundancy in backbone area (incl. uplink)
- Redundant electricity hookups incl. UPS for PoE switches for services like VoIP/Wi-Fi

The District Office also recommended an additional criterion: using as few suppliers and service providers as possible, in order to preserve system continuity and avoid confusion on division of responsibilities.



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Consistent concept

Conetis GmbH bid in on the project with network components and access points manufactured by D-Link, and was ultimately awarded the contract. The systems integrators have excellent references within the educational world, and are approved by the German Ministry of Education and Cultural Affairs as official support providers for PaedML, a paediatric sample solution. Of course, the service providers also scored points through their consistent use of D-Link hardware. Overall, the components won District Office officials over with both their technical functionality and their price-performance ratio, as Thorsten Jakob, the District Office official in charge of the project, confirms. "We are pleased that the competitive tendering procedure led us to a partner that proved to be such a good choice. After all, our primary goal is to ensure that our schools are optimally equipped."

Work-intensive summer holidays

Empty hallways, nobody around who might be bothered by the noise - the 2016 summer holidays were a perfect opportunity to lay the new network cabling. The planning team also scheduled important construction work, such as expanding a building distributor room, during the summer holidays. Knowing an additional building distribution box would be necessary, they simply "walled it in" as they went along: the engineering team simply wrapped the box up securely and put it into its final position, and the builders worked around it - thus saving everyone the hassle of dismantling the box and then reassembling it later. The approximately 500 new copper network cable lines were also laid within the ceilings during this construction phase. The cable lines required wall breakthroughs as large as 20cm at times, and X-ray equipment was occasionally necessary to ensure that the breakthroughs would not damage any steel reinforcements within the concrete, which could affect building stability. Switches and access points (APs) were installed towards the end of the summer holidays. Step one of this phase involved distributing a total of 45 compact DWL-8610AP systems throughout the school's two theory buildings, A and B. The APs are controlled centrally by a redundant pair of DWC-2000 Wi-Fi controllers. The illumination test performed by Conetis and D-Link revealed that approximately half of the classrooms would need a wireless AP to guarantee comprehensive wireless coverage

throughout campus. Should bottlenecks still develop when the system is in productive operation, the buildings have sufficient reserve cabling that classrooms without their own access points can be retrofitted easily. Each of the building distributors includes a stack of four DGS-3420 series Gigabit Layer 2+ managed switches. Each of those stacks has a redundant 10Gb uplink connection to the central campus backbone. The backbone itself, in turn, comprises a stack of two redundant DXS-3600-32 series 10 Gigabit Layer 3 Managed Switches. Key switches (backbone, PoE/VoIP) also have redundant power supplies / supply cables as well as an Uninterruptible Power Supply system. The hardware commissioning process was followed by a two-week test phase; both went according to plan, and the campus wireless system was officially made available to pupils just before autumn half-term.

Innovative teaching programme

As expected, there was a massive run on the new network from both teachers and pupils. As with any IT project, there were a few small bumps during the transition to its productive operation. Dirk Riebesell, who had encountered these types of projects during his time as a corporate IT manager, expressed satisfaction with the launch: "This was a highly complex project, and we had a wide range of requirements to accommodate. Thanks to D-Link components and our collaboration with Conetis, we succeeded wonderfully." Key factors in his eyes include, of course, uninterrupted network operation and the potential for continuous network usage in the classroom. Currently, GDS1 has two sets of tablets available for staff to borrow and use in lessons. The school began by selecting teachers in each subject area to act as trailblazers and test out the new technology. The next step will be continuously expanding the network's range of applications. Phase two of the network construction process will also continue, with the network being expanded to include other buildings. Thanks to foresight in project planning and consistent project realisation, Gottlieb-Daimler-Schule 1 is now exceptionally well prepared to implement new digital learning concepts. The school also wishes to thank the Böblingen District Office for making the necessary resources available and supporting them with this large-scale project.

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