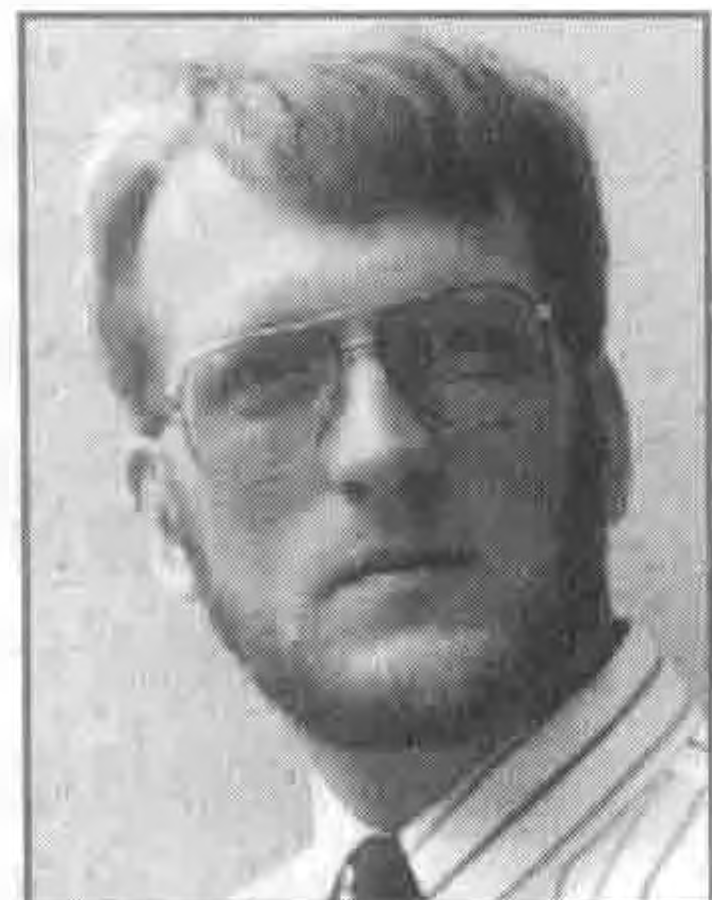


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人物专访

Henning Schulzrinne 是哥伦比亚大学的教授、计算机科学系的主任和因特网实时实验室的负责人。他是 RTP、RTSP、SIP 和 GIST 这些音频和视频经因特网通信的关键协议的作者之一。Henning 在德国达姆施塔特工业大学 (TU Darmstadt) 获得了电气工业工程学士学位, 在辛辛那提大学获得了电气和计算机工程硕士学位, 以及在马萨诸塞大学阿默斯特学院获得了电气工程博士学位。



Henning Schulzrinne

- 是什么使得您决定致力于多媒体网络?

这几乎是巧合。作为一个博士生, 我从事 DARTnet 方面的工作, DARTnet 是一个用 T1 线路跨越美国的实验网络。DARTnet 用于为多播和因特网实时工具提供场所。这促使我写了我的第一个音频工具 NeVoT。通过一些 DARTnet 的参与者, 我开始参与 IETF 和那时新成立的音频视频传输工作组的工作。这个工作组后来完成了 RTP 的标准化。

- 您在计算机行业中的第一份工作是什么? 它给了您什么收获?

我在计算机行业的第一份工作是在加利福尼亚的 Livermore 读高中时焊接一个牵牛星 (Altair) 计算机工具包。回到德国, 我开了一个小咨询公司来给旅行社设计一个地址管理程序, 为我们的 TRS-80 开发了将数据存储在磁带上的功能, 并通过一个自己制作的硬件接口把 IBM 的电动打字机作为打印机使用。

我第一份真正的工作是在 AT&T 的贝尔实验室, 为在实验室环境下构建实验网络而研发的一个网络仿真器。

- 因特网实时实验室的目的是什么?

我们的目的是为因特网作为单一的未来通信基础设施提供组件和构件模块。这包括开发新协议, 如 GIST (用于网络层信令) 和 LoST (用于由位置寻找资源), 或通过丰富呈现、对等系统、下一代紧急情况呼叫和服务产生工具等方面的工作加强我们以前从事的协议, 如 SIP。最近, 我们也大规模地研究了用于 VoIP 的无线系统, 因为 802.11b 和 802.11n 网络以及也许 WiMAX 网络有可能成为用于电话的重要的最后 1 英里技术。我们也试图使用一种称为 DYSWIS (Do You See What I See, 你所见即我所见) 的对等方到对等方故障诊断系统, 大大改进用户在面对提供商和设备的复杂、混乱问题时的故障诊断能力。

通过构建原型和开放源码系统、测量实际系统的性能, 以及对 IETF 标准做出贡献, 我们试图做些实践性相关工作。

- 您对多媒体网络的未来展望是什么?

我们现在正处于一种过渡阶段, 距离 IP 成为从 IPTV 到 VoIP 等多媒体服务的通用平台只有几年之遥了。我们期望着收音机、电话和电视即使在暴风雨和地震中都能工作, 所以当因特网接替了这些专用网络的职责时, 用户将期待有同样级别的可靠性。

我们将不得不学会为一个生态系统设计网络技术, 该生态系统包括竞争的电信公司、服务和内容提供商, 服务于大量技术上未受训练的用户, 并保护他们免受少数但具有破坏性的一批恶意和犯罪用户的侵害。改变协议变得日益艰难。协议也变得更加复杂, 因为它们需要考虑竞争的商业利益、安全性、隐私以及由防火墙和网络地址转换引起的网络透明性的欠缺。

因为多媒体网络正在成为几乎所有消费者娱乐的基础, 因此以低成本管理非常大的网络将成为重点。用户将期待易于使用的网络, 例如可以在所有的设备上找到相同的内容。

- 为什么 SIP 的未来很有前途?

随着现在的无线网络正在向 3G 网络升级, 希望单个多媒体信令机制能够跨越所有类型的网络, 包括从电缆调制解调器到企业电话网和公用无线网络。这连同软件无线电一道, 在将来使下列东西成为可能: 单一设备能被用于家庭网络中, 能被作为无绳蓝牙电话, 用于经 802.11 的企业网中和经 3G 网络的

广域网中。即使在我们有这样一个通用的无线设备之前，个人移动机制使得隐藏网络之间差别成为可能。一个标识成为找到一个人的通用方法，而不必记住或者分发一堆特定技术或特定位置的电话号码。

SIP 还将提供语音（比特）传输和语音服务分离。现在打破本地电话垄断在技术上已成为可能，即一个公司提供中性的比特传输，其他的公司提供 IP “拨号音” 和常用的电话服务，例如网关、呼叫转移和主叫者 ID。

除了多媒体信令，SIP 提供在因特网中缺少的一种新服务：事件通知。我们已经有了这种具有 HTTP 不完善系统和电子邮件功能的近似服务，但是这决不会令人非常满意。因为事件是对分布式系统的通用抽象，这样可能简化新服务的构建。

- 您对进入网络领域的学生有什么忠告吗？

网络沟通了多个学科。它源于电子工程和计算机科学、运筹学、经济学和其他学科的所有方面。因此，网络研究者必须熟悉除了协议和路由选择算法以外的主题。

既然网络已经成为日常生活中如此重要的一部分，要在该领域标新立异的学生们应当思考网络中新的资源限制：人的时间及努力，而不只是带宽或存储。

从事网络研究工作能够给人以极大的满足，因为它使得人们能够相互通信和交换思想，这是人类所必需的。因特网服务提供商已经成为第三大全球性基础设施，接近于运输系统和能源分配。经济领域几乎没有哪个部分离开高性能网络还能正常运转，由此对可预测的将来应当有大量机会。

参 考 文 献

有关 URL 的说明。在下面的引用中，我们提供了 Web 网页、仅在 Web 上有的文档和没有被会议或杂志出版的其他材料的 URL（当我们能够指出这些材料的位置时）。我们没有提供有关会议和杂志出版物的 URL，因为这些文档通常能够通过如下方式找到：使用某个搜索引擎，经该会议的 Web 站点（例如在所有 ACM SIGCOMM 会议和专题讨论会中的文章能够通过 <http://www.acm.org/sigcomm> 找到），或通过订阅数字图书馆。尽管到 2016 年 1 月，下面提供的所有 URL 都是有效的，但 URL 可能会过期。对于过期的文献，请参考本书的在线版本（<http://www.pearsonhighered.com/cs-resources>）。

有关因特网请求评论（RFC）的说明。因特网 RFC 的副本在多个网站上都可找到。因特网协会（监管 RFC 文档的组织）的 RFC 编辑们维护着网站 <http://www.rfc-editor.org>。该网站允许你通过标题、编号或作者来搜索某个特定的 RFC 文档，并将显示出对任何所列 RFC 的更新。因特网 RFC 可以被后面的 RFC 所更新或淘汰。我们喜欢的获取 RFC 文档的网站是初始 RFC 源，即 <http://www.rfc-editor.org>。

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