KNOWLEDGE NOTES · 学习笔记

黄仁勋：机器鸭引爆具身智能

老黄在GTC柏林现场被4只机器鸭"不听话"逼到幼儿园老师附体——翻跟头、睡午觉、走丢方向，全场笑翻的同时，英伟达的物理AI野心也藏不住了。

VPF 学习材料
视频知识解析 · 2026-10-24

内容摘要

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原文赏析

Hey guys. Oh yeah? Okay, come on. Here, come over here. Show people, you can walk. And you have a camera. Oh yeah? Don't trip. Can you guys sit down? Okay, stand up. Take a nap. Take a nap. You need to take a nap. Okay, stand up. Did you know that you were created in here? You were created on RTX Spark. I know. And trained you in the cloud on a whole bunch of NVIDIA supercomputers, and you learned your skills right here on RTX Spark in a digital twin, the Omniverse digital twin. Isn't that incredible? I know. I know. You guys are so cute. And your are called Pollen. Is that right? Uh-huh. Pollen Robotics. And apparently, everybody loves you guys so much. You're sold out. I know. If you go to the Pollen website- everybody, everybody watching this- you know, there's going to be like 20 million viewers. Everybody watching this. Go to the Pollen website and place an order. I think this startup company is like 10 people. They might blow up. Poof. It's going to be so exciting. Everybody should have one. You guys are so cute. And so we'll just have an RTX Spark and we'll teach you new skills. Isn't that cool? Isn't that right? Oi. Oi, oi. Oh, look at that. Incredible. Can you do a somersault? That's so good. That's so good. Wow. Okay. Well, guess what? Okay. So. Today. What did we talk about? We talked about Europe building its AI economy. And it starts with infrastructure. And we announced a brand new, brand new system called DGX Pod. It makes it easy for you to build AI factories. And these AI factories don't just run models anymore. Pay attention. Stay focused. Come here. Come here. Come over here. Stay focused. And these AI factories don't just run... There, you go. Sit down. Yeah. They don't just run AI models anymore. They run entire agents. And these agents are consistent of five things. The large language model that does the perception, reasoning, planning, and acting. And it runs in conjunction with a harness that turns it. It's essentially exoskeleton. And runs. That harness, sits inside, runs inside a secure runtime. We call Open Shell, which has just so many people that have supported it. And you give it access to knowledge and tools. And this agent runs on top of these computers, but we're also extending into the next generation, which is where you guys come in: physical AI. So that's it. That's what we talked about. Everybody can build agents. Every company in Europe will become an AI company. There's no question. Everybody will become an AI company. And we're going to have a thriving AI economy here in Europe. So, after 30... Years, what an incredible journey. And we made a really cool video. You guys. Want to watch it together. Okay. Come on. Come over here. Just come over here. Just a little bit. We'll get out of the way. Come on. Top speed. Top speed.

【词数校验】：511

参考译文

嘿，伙计们。哦，是吗？好，来吧。过来，到这儿来。给大家展示一下，你能走路。你还有摄像头。哦，是吗？别绊倒了。你们能坐下吗？好，站起来。睡个午觉。睡个午觉。你得睡个午觉。好，站起来。你们知道吗，你们就是在这里被创造出来的？你们诞生于 RTX Spark。我知道。而且在云端，用一大批英伟达超级计算机训练了你们，你们就是在这里，在 RTX Spark 上，在一个数字孪生环境里学到了技能——就是 Omniverse 数字孪生。是不是很不可思议？我知道。我知道。你们太可爱了。你们的名字叫 Pollen，对吗？嗯哼。Pollen Robotics。而且显然，大家太喜欢你们了。你们都卖断货了。我知道。如果你们去 Pollen 的网站——各位，所有正在观看的人——你知道，大概会有两千万观众。所有正在看直播的人。去 Pollen 网站下单吧。我觉得这家创业公司大概只有 10 个人。他们可能会爆掉。噗。那会太令人兴奋了。每个人都应该拥有一只。你们太可爱了。所以，我们只要有一台 RTX Spark，就能教你们新技能。是不是很酷？对不对？喂。喂，喂。哦，看看那个。太厉害了。你能翻个跟头吗？太棒了。太棒了。哇。好。那么，猜猜怎么着？好。那么。今天。我们讲了什么？我们讲了欧洲建设自己的 AI 经济。而这一切始于基础设施。我们发布了一套全新的、全新的系统，叫 DGX Pod。它让你能轻松地建造 AI 工厂。而这些 AI 工厂不再只是运行模型了。注意。保持专注。过来。过来。到这儿来。保持专注。而这些 AI 工厂不只是运行……好，这就对了。坐下。没错。它们不再只是运行 AI 模型了。它们运行的是完整的智能体。这些智能体由五部分组成。大语言模型负责感知、推理、规划和行动。它与一个驾驭它的"缰绳"协同运行。它本质上是一副外骨骼。然后运行。那个"缰绳"，位于内部，运行在一个安全的运行时环境里。我们称之为 Open Shell，已经有非常多的人支持它了。你让它能访问知识和工具。这个智能体运行在这些计算机之上，但我们也在向下一代延伸——这就是你们登场的领域：实体 AI。就是这样。这就是我们今天讲的。每个人都能构建智能体。欧洲的每一家公司都会变成 AI 公司。毫无疑问。每家公司都会变成 AI 公司。我们将在欧洲拥有一个蓬勃发展的 AI 经济。所以，经过 30……年，多么不可思议的一段旅程。我们制作了一个非常酷的视频。你们。想一起看看吗？好。来吧。到这儿来。就过来这儿。再过来一点点。我们让开点。来吧。全速前进。全速前进。

词汇学习

速览

词汇	音标	释义	原文
somersault	/ˈsʌməsɔːlt/	翻跟头	Can you do a somersault?
infrastructure	/ˈɪnfrəstrʌktʃə/	基础设施	It starts with infrastructure
agent	/ˈeɪdʒənt/	智能体	They run entire agents
perception	/pəˈsepʃn/	感知	the perception, reasoning, planning, and acting
reasoning	/ˈriːznɪŋ/	推理	the perception, reasoning, planning, and acting
harness	/ˈhaːnɪs/	缰绳；驾驭装置	a harness that turns it
runtime	/ˈrʌntaɪm/	运行时环境	runs inside a secure runtime
digital twin	/ˈdɪdʒɪtl twɪn/	数字孪生	the Omniverse digital twin
thriving	/ˈθraɪvɪŋ/	蓬勃发展的	a thriving AI economy
sold out	/səʊld aʊt/	售罄	You're sold out
blow up	/bləʊ ʌp/	爆火、爆发	They might blow up
startup	/ˈstaːtʌp/	初创公司	this startup company
exoskeleton	/ˈeksəʊskelɪtn/	外骨骼	It's essentially exoskeleton

精讲

1. agent /ˈeɪdʒənt/ n. 智能体；代理人

原文中 They run entire agents 中的 agent 是当下 AI 领域最核心的概念——不是"代理"或"中介"，而是指能自主感知、决策、行动的 AI 智能体。这个词本义是"代理人、代理商"（如 travel agent 旅行社代理人），词根 ag- 意为"做、驱动"。在 AI 语境中，它强调系统从"被动回应指令"转向"主动执行任务"。英伟达将 agent 定义为五要素组合：大语言模型 + 驾驭装置 + 安全运行时 + 知识工具 + 运行平台，这是理解整段演讲的钥匙。原文中 These agents are consistent of five things 即指这五要素。注意 agent 与 AI model 是不同的概念，后者只是智能体的一个组成部分。

2. harness /ˈhɑːnɪs/ n. 驾驭装置；缰绳

原文 *a harness that turns it* 中的 harness 原义是马的"挽具、缰绳"，引申为"约束、驾驭的工具"。在演讲中，黄仁勋用它比喻连接大语言模型与外部世界的中介框架——它决定模型如何调用工具、如何反馈结果，就像缰绳控制马的方向。动词用法 harness the power of（驾驭……的力量）是学术写作高频搭配。联想记忆：harness 与 horse（马）在词源上相关，想象"给马套上挽具"即能记住核心义。原文中 It's *essentially exoskeleton* 是对它的进一步比喻——像外骨骼一样包裹并支撑模型。

3. perception /pəˈsepʃn/ n. 感知

原文 *The large language model that does the perception, reasoning, planning, and acting* 中，perception 是智能体认知链条的第一步——接收并理解外部信息。词根 -cept- 来自拉丁语 *capere*，意为"拿取"，per- 是"完全地"，合起来就是"完全拿到（信息）"，即感知。同根词：*concept*（概念，被想到的东西）、*reception*（接待，被接收的状态）。注意区分 perception（感知，感官层面）与 *cognition*（认知，更广泛的心理过程）。AI 语境中，perception 涵盖视觉、听觉、文本等多模态信息输入。

4. infrastructure /ˈɪnfrəstrʌktʃə/ n. 基础设施

原文 It starts with infrastructure 中的 infrastructure 是理解英伟达战略的关键词。词根 struct- 意为"建造"（如 construct、structure），infra- 是"在下方"的前缀，合起来是"底层建筑"，即支撑一切的基础设施。英伟达认为 AI 经济的根基是算力基础设施——GPU、超级计算机、DGX Pod 系统。与中国的"新基建"（new infrastructure）概念异曲同工。注意该词不可数，没有复数形式，不能说 infrastructures（虽然非正式场合有误用），只能说 infrastructure 或 pieces of infrastructure。

5. thriving /ˈθraɪvɪŋ/ adj. 蓬勃发展的

原文 *a thriving AI economy* 中的 thriving 是描述经济腾飞、事业兴旺的高频形容词，比 growing 更有画面感——thrive 源自北欧语，本义是"抓紧、繁盛生长"，让人联想到植物蓬勃向上。动词 thrive 常与介词 on 搭配：thrive on challenges（在挑战中茁壮成长）。名词形式为 thriving（不可数）。它比 prosperous 更强调"正在生长"的动态感，比 booming 更温和持久。原文中 thriving AI economy 传达的是"生态繁荣"而非短暂爆发，与整场演讲"基础设施→智能体→生态"的逻辑吻合。

语块学习

1. come over here

- **语块结构**: come over here
- **释义**: 到这边来
- **功能**: 现场指挥、引导移动的口语指令
- **原文语境**: "Come over here. Show people, you can walk." / "Come over here. Just come over here. Just a little bit."

- **迁移运用**: 在课堂或会议中引导他人靠近时可说：*Come over here and take a look at this chart.*

2. take a nap

- **语块结构**: take a nap
- **释义**: 睡个午觉、打个盹
- **功能**: 表达"小睡片刻"，口语高频搭配
- **原文语境**: "Take a nap. Take a nap. You need to take a nap."
- **迁移运用**: 工作间隙提醒自己休息：I usually take a nap after lunch to recharge.

3. sold out

- **语块结构**: be sold out
- **释义**: 售罄、卖断货
- **功能**: 描述库存为零、供不应求
- **原文语境**: "Everybody loves you guys so much. You're sold out."
- **迁移运用**: 描述热门商品缺货：The new iPhone model was sold out within hours of its release.

4. place an order

- **语块结构**: place an order
- **释义**: 下单、订货
- **功能**: 商务场景中正式表达"购买"
- **原文语境**: "Go to the Pollen website and place an order."
- **迁移运用**: 采购场景：We'd like to place an order for 500 units by the end of this week.

5. blow up

- **语块结构**: blow up
- **释义**: 爆火、突然走红；爆炸
- **功能**: 形容事物突然爆发式增长或走红（口语）
- **原文语境**: "I think this startup company is like 10 people. They might blow up. Poof."
- **迁移运用**: 描述某产品突然爆火：That indie game blew up overnight after a YouTuber reviewed it.

6. pay attention

- **语块结构**: pay attention (to)
- **释义**: 注意、集中注意力
- **功能**: 提醒对方专注，常带祈使语气
- **原文语境**: "Pay attention. Stay focused."
- **迁移运用**: 课堂中提醒学生：Pay attention to the details; they matter more than you think.

7. stay focused

- **语块结构**: stay focused
- **释义**: 保持专注
- **功能**: 鼓励持续专注，常用于工作/学习场景
- **原文语境**: "Pay attention. Stay focused." / "Stay focused."
- **迁移运用**: 项目收尾时自我提醒：Stay focused and finish the final draft tonight.

8. in conjunction with

- **语块结构**: in conjunction with
- **释义**: 与……协同、配合
- **功能**: 正式表达"共同作用"，多用于技术/学术语境
- **原文语境**: "It runs in conjunction with a harness that turns it."
- **迁移运用**: 项目管理表述：The software works in conjunction with existing hardware to improve efficiency.

9. in a digital twin

- **语块结构**: digital twin
- **释义**: 数字孪生（实体对象的虚拟镜像）
- **功能**: 技术术语，指虚拟环境中对现实系统的仿真复制
- **原文语境**: "You learned your skills right here on RTX Spark in a digital twin, the Omniverse digital twin."
- **迁移运用**: 工业4.0语境：Engineers use a digital twin to simulate factory operations before deploying them physically.

10. there you go

- **语块结构**: there you go
- **释义**: 这就对了，干得好
- **功能**: 认可对方行为完成，口语极高频
- **原文语境**: "There, you go. Sit down. Yeah."
- **迁移运用**: 当对方完成一个小任务时鼓励：There you go — you've got the hang of it.

11. what an incredible journey

- **语块结构**: what + a/an + 形容词 + 名词
- **释义**: 多么不可思议的一段旅程
- **功能**: 感叹句式，表达强烈情感
- **原文语境**: "Years, what an incredible journey."
- **迁移运用**: 回顾奋斗历程：Thirty years of hard work — what an incredible journey it has been.

表达模式与句型归纳

1. 祈使指令模式（现场指挥）

- 句型结构：动词原形 +（宾语/方向补语）
- 功能说明：直接下达指令，语气干脆利落，适合现场演示和指挥场景
- 原文实例："Come over here." / "Show people, you can walk." / "Don't trip." / "Sit down." / "Stand up." / "Take a nap." / "Pay attention." / "Stay focused." / "Come on. Top speed."
- 仿写练习：指挥机器人演示时：Turn around. Pick up the box. Don't drop it.

2. 一般疑问句表达（确认事实）

- 句型结构：助动词/情态动词 + 主语 + 谓语…？
- 功能说明：用升调提问确认信息，在对话中引导对方回应
- 原文实例："Can you guys sit down?" / "Did you know that you were created in here?" / "Isn't that incredible?" / "Is that right?" / "Can you do a somersault?" / "Isn't that cool?" / "Isn't that right?"
- 仿写练习：确认设备状态：Did you know that this system was tested in a simulation first?

3. 强调递进（not just... anymore）

- 句型结构：not just X anymore → Y（更进一步）
- 功能说明：先否定旧状态，再引出新变化，强调质变
- 原文实例："And these AI factories don't just run models anymore... They don't just run AI models anymore. They run entire agents."
- 仿写练习：描述技术升级：This phone doesn't just make calls anymore — it manages your entire digital life.

4. 感叹句表达强烈情感

- 句型结构：What + a/an + 形容词 + 名词！/ 形容词 + 主语 + 谓语！
- 功能说明：表达赞叹、惊讶等强烈情绪，口语高频
- 原文实例："What an incredible journey." / "That's so good." / "Incredible."
- 仿写练习：看到惊人成果：What a stunning result! That's so impressive.

5. 总结回顾（So that's it. That's what...）

- 句型结构：So that's it. That's what + 主语 + 动词 + 过去…
- 功能说明：演讲收尾时总结核心内容，清晰利落
- 原文实例："So that's it. That's what we talked about."

- **仿写练习**：汇报完毕：So that's it. That's what we achieved this quarter.

语法知识点

1. 祈使句（动词原形开头）

- **概念解释**：省略主语 you，直接用动词原形表达命令、请求、建议
- **结构公式**：V + (宾语/补语) / Let's + V / Don't + V
- **原文例句**："Come over here." / "Don't trip." / "Sit down." / "Go to the Pollen website and place an order."
- **易错提醒**：中文学习者常漏掉 don't 就直接用"no + 动词"表达否定祈使，应改为 Don't + 动词原形。

2. 一般疑问句（倒装语序）

- **概念解释**：助动词/be/情态动词提到主语前，句末升调
- **结构公式**：Aux + S + V + …? / Be + S + …? / Modal + S + V + …?
- **原文例句**："Can you guys sit down?" / "Did you know that you were created in here?" / "Isn't that incredible?" / "Is that right?"
- **易错提醒**：学习者常忘记一般疑问句需要倒装，尤其是 be 动词和情态动词。注意 Isn't that incredible? 是否定疑问，表强烈认同。

3. 现在完成时（have/has + 过去分词）表过去影响现在

- **概念解释**：表示过去发生的动作对现在有影响，或持续到现在
- **结构公式**：S + have/has + V-ed + …
- **原文例句**："Which has just so many people that have supported it." / "You're sold out."（are + 过去分词 sold，系表结构表状态）
- **易错提醒**：中文没有对应时态，学习者在口语中常误用一般过去时代替完成时，应注意区分 "I read the book"（过去读了）与 "I've read the book"（读完了，现在知道内容）。

4. 定语从句修饰

- **概念解释**：由 that/which/who 引导，修饰名词或代词，限制或补充说明
- **结构公式**：N + that/which/who + 从句
- **原文例句**："We call Open Shell, which has just so many people that have supported it."（which 从句非限定修饰 Open Shell，that 从句限定修饰 people）
- **易错提醒**：学习者常混淆 which 与 that 的用法——限定性定语从句两者皆可，非限定性定语从句只能用 which 且须加逗号。

5. 被动语态

- **概念解释**: 强调动作承受者，be + 过去分词
- **结构公式**: S + be + V-ed + (by + 施动者)
- **原文例句**: "You were created on RTX Spark." （强调"你被创造"而非"谁创造"）
- **易错提醒**: 中文习惯用主动句，翻译时注意转换——英语被动句往往对应中文的无主句或主动句，不可机械直译。

长难句解析

1. And trained you in the cloud...

- **完整句子**: And trained you in the cloud on a whole bunch of NVIDIA supercomputers, and you learned your skills right here on RTX Spark in a digital twin, the Omniverse digital twin.
- **中文翻译**: 而且在云端，用一大批英伟达超级计算机训练了你们，而你们就在这里，在 RTX Spark 上，在一个数字孪生环境中学会了技能——就是 Omniverse 数字孪生环境。
- **句法拆解**:
- 主干: 并列结构——(we) trained you... + you learned your skills...
- 修饰: 第一分句 in the cloud（状语）+ on a whole bunch of NVIDIA supercomputers（方式状语）；第二分句 right here on RTX Spark（地点状语）+ in a digital twin（方式状语）+ the Omniverse digital twin（同位语补充说明）
- 核心关系: 前半句讲训练发生的场景（云端+超算），后半句讲技能习得的场景（本地+数字孪生），两个场景形成对比。同位语 the Omniverse digital twin 是对 digital twin 的限定说明。
- **难点分析**: 学习者容易把第一分句理解为 "trained you in the cloud" 是完整句——实际主语是隐含的 "we"（英伟达），属于口语中的省略。而 a whole bunch of 是口语化的"一大堆"。后半句 right here 强调地点对比——训练在云端，但技能学习在本地。同位语的使用使句子结构拉长，需识别其与先行词的关系。

2. And it runs in conjunction with a harness...

- **完整句子**: And it runs in conjunction with a harness that turns it. It's essentially exoskeleton. And runs. That harness, sits inside, runs inside a secure runtime. We call Open Shell, which has just so many people that have supported it.
- **中文翻译**: 它与一个驾驭它的"缰绳"协同运行。它本质上是一副外骨骼。然后运行。那个"缰绳"位于内部，运行在一个安全的运行时环境里，我们称之为 Open Shell，已经有非常多的人支持它了。
- **句法拆解**:
- 主干: it runs + it's exoskeleton + that harness runs inside a secure runtime + we call Open Shell
- 从句/修饰: that turns it（定语从句修饰 harness）；which has just so many people that have supported it（非限定定语从句修饰 Open Shell，内含 so...that 结果状语从句）

- **核心关系**: 主干陈述智能体的运行机制——模型与 harness 协同，harness 运行于 secure runtime 中，runtime 被命名为 Open Shell。so many people that have supported it 表示"如此多的人以至于……"实际上 that have supported it 是修饰 people 的定语从句，而非结果状语从句——属于口语中 so...that 结构的松散用法。
- **难点分析**: 本段极其口语化，句子断裂严重（And runs. 单独成句）、插入语频繁（That harness, sits inside, 中 sits 前主语跳跃），学习者需先恢复完整语义再分析句法。核心挑战在于识别 that turns it 中 it 指代 the large language model，以及 which 指代 Open Shell。口语语流中逻辑连接词被省略，需要靠语义推断。

3. And this agent runs on top of these computers...

- **完整句子**: And this agent runs on top of these computers, but we're also extending into the next generation, which is where you guys come in: physical AI.
- **中文翻译**: 这个智能体运行在这些计算机之上，但我们也在向下一代延伸——这就是你们登场的领域：实体 AI。
- **句法拆解**:
- 主干: this agent runs on top of these computers + we're extending into the next generation（but 连接，表转折）
- 从句/修饰: which is where you guys come in（非限定定语从句，which 指代 the next generation）；physical AI（同位语，补充说明 where 从句的具体内容）
- **核心关系**: 转折——现状是智能体运行在计算机上，但未来正在延伸，"你们（机器鸭）"登场之处正是实体 AI。同位语 physical AI 将抽象概念具象化。
- **难点分析**: which is where you guys come in 嵌套了两层——which 引导非限定定语从句，其表语又是一个 where 引导的表语从句。come in 是口语化表达，意为"登场、参与"。学习者的难点在于识别 which 的指代对象（the next generation，而非 computers），以及 where 从句在整个结构中的作用。

背景信息

1. RTX Spark

- **原文出处**: "You were created on RTX Spark." / "you learned your skills right here on RTX Spark in a digital twin"
- **背景解释**: RTX Spark 是英伟达推出的本地 AI 计算平台——将 RTX 显卡的算力浓缩为个人桌面级设备，使开发者无需云端集群即可进行 AI 训练和推理。黄仁勋在演讲中反复强调"一台笔记本+一个AI智能体"即可训练机器人，RTX Spark 正是这一理念的硬件载体。
- **理解要点**: RTX Spark 代表英伟达从"云端算力垄断"向"终端算力普及"的战略转型——让中小企业和个人开发者也能参与 AI 开发。

2. Omniverse Digital Twin（Omniverse 数字孪生）

- **原文出处**: "you learned your skills right here on RTX Spark in a digital twin, the Omniverse digital twin"
- **背景解释**: Omniverse 是英伟达的 3D 仿真与协作平台，用于构建物理世界的虚拟镜像（数字孪生）。机器人可在虚拟环境中无限次试错、训练、优化策略，再将策略迁移到实体——即 Sim2Real（仿真到现实）流程。
- **理解要点**: 数字孪生是降低 AI 训练成本的核心技术——在虚拟世界训练失败的成本远低于物理世界，这也是"一台笔记本即可训练机器人"的关键。

3. Pollen Robotics

- **原文出处**: "Pollen Robotics. And apparently, everybody loves you guys so much. You're sold out."
- **背景解释**: Pollen Robotics 是一家源自法国波尔多大学的机器人初创公司，后被 Hugging Face 收购。其开发的微型双足机器人以开源、低成本著称，团队仅约 10 人。黄仁勋在演讲中现场为该产品"带货"，体现英伟达扶持开发者生态的商业策略。
- **理解要点**: Pollen Robotics 的案例印证了英伟达的核心叙事——AI 机器人开发的门槛已从大团队压缩到小团队甚至个人，而英伟达的硬件平台是这一切的算力底座。

4. DGX Pod

- **原文出处**: "And we announced a brand new, brand new system called DGX Pod. It makes it easy for you to build AI factories."
- **背景解释**: DGX Pod 是英伟达发布的模块化 AI 数据中心系统——将 GPU 计算、存储、网络、散热等集成为预制化机柜，企业可像搭积木一样快速部署 AI 算力。黄仁勋称其为"AI 工厂"的基础设施。
- **理解要点**: DGX Pod 解决了企业自建 AI 算力耗时耗力的痛点——从采购到上线压缩数周，使"每家欧洲公司都成为 AI 公司"变得可行。

5. Open Shell

- **原文出处**: "We call Open Shell, which has just so many people that have supported it."
- **背景解释**: Open Shell 是英伟达推出的开源 AI 智能体运行时框架——为智能体提供安全、可控的执行环境，类似于 AI 领域的 Kubernetes（容器编排平台）。黄仁勋强调"很多人支持它"，暗示其正在成为行业标准。
- **理解要点**: Open Shell 的核心价值是"安全运行时"——让智能体在受控环境中访问知识与工具，防止大语言模型越权操作，是实体 AI 落地的基础设施。