Reasons/obstacles, which prevent Deutsche Telekom AG to quickly implement IPv6 :

Deutsche Telekom AG is strongly interested to support new technologies such as IPv6 and to offer new services to their customers. Therefore, in principle IPv6 could be implemented, however ....

- ***Currently no adequate market demand for IPv6 exists!***

- Real, market driven IPv6-Applications are currently not visible (possibly UMTS 2002 ?); as a consequence there still exists no real customer driven demand. (Situation: “Trivial Hen-and-Egg Problem 1”)
- Microsoft will implement IPv6 only with next generation Windows-System "Whistler" approx. 2002; then more applications and customer demand is likely to show up (Until now IPv6 can only be installed as "Preview" Version in Windows 2000 and Windows NT and nearly no Windows applications support it.

- ***Actual investments in Deutsche Telekom AG's IP network infrastructure do not allow for high additional investment without secured RoI !***

  - In the framework of current IP network upgrade (IP2) Routers, Switches etc. have just been equipped with IPv4/MPLS which has requested a high investment. At an earliest the transition towards IPv6 is only economically feasible with the next generation network upgrade (IP3). Anything other than that were expensive intermediate solutions, which are not feasible for the mass market.

- ***The definition of sustaining business models and finally individual business cases on the basis of sound customer demand is not yet possible!***

  - The risk of tremendous investments without sufficient knowledge of customer demand is not feasable for a single network operator.
  - Similarly, experiences are not yet available as well as cost/benefit calculations for the implementation and the operation on the basis of well defined scenarios for a mass market are missing of lead to „red figures
  - Number of customers can only be calculated extremely vague.

- ***IPv6 Support of the Routers is not in a shape which allows carrier grade operations with similar quality as IPv4 does.***
  - Nearly no Router-manufacturer for Carrier-Grade area (except Hitachi) has yet delivered any IPv6 implementations as Productions-Releases. Second Sources not in sight at all. . Prognosis: 2002 at an earliest.
  - Hardware support of IPv6 in the backbone equipment (e.g. from Cisco) is not yet available and is expected to be available for the related equipment not before the end of 2001.
  - Current IPv6 support is Software-based and accordingly has limitations in performance, i.e., support of IPv6-functions is currently limited for very small number of users and is only feasable within test installations/ show cases possible and results in high costs. Currently the mass market cannot be addressed
  - Work arounds (z.B. IPv6-in-IPv4 tunnelling solutions) result in limitations of functions of IPv6 (e.g. no guarantee of QoS).
  - Currently no support of IPv6 in most of the Routers in the Dial-In / Access Area (Intel/Shiva/Ascend) of the IP-Network of Deutsche Telekom AG. Manufacturers do not give any commitment of availability of IPv6 in their equipment.

- ***White spaces still exist in IPv6 standardisation and implementations, which does not allow world-wide IPv6 Roll-Out in production quality!***

  - The world wide domain name system – responsible for the translation of names into IP addresses and vice versa does not fully support IPv6. There is no comparable infrastructure as with IPv4 in place.
    (Missing Root Server, necessity of updates of clients (software) and Domain Name Server.)
  - Currently the AAA subject for IPv6 (Accounting, Authorisation and Authentication - required for Dial-In) still under standardisation within the IETF. No implementation is yet available.
  - First implementations of the necessary network management functions are expected in the second half of 2001.
  - Currently no final commitment to integrate this into the operational network management system of Deutsche Telekom AG.
  - Until now there is no consensus on the ISP/Telco-Side to select one of the manyfold transitional solutions IPv6. Currently IETF works on proposals and procedures related to network interworking and transition scenarios.

- ***In addition ...***

  - What are the benefits for an early offer of IPv6 based services for Deutsche Telekom AG in the Internet area if there were only very few providers who co-operate in establishing a worldwide IPv6 network ? (Situation: “Trivial Hen-and-Egg Problem 2”).

  - The necessary prerequisite for a nation wide implementation of IPv6 are positive results from the initiated national and international projects.

    - National project with Deutsches Forschungsnetz (DFN);
    - International projects *(6Init, Brain, 6Winit, Moby Dick, Armstrong);*
    - Joint co-operation with Cisco to define a scenario for transition from IPv4 to IPv6, especially taking into account network management and service management requirements.

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