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**Why Local Loop Unbundling Fails?**

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## **Abstract**

The paper examines why local loop unbundling (LLU) mostly fails. Unbundling, in principle, makes the local loop (subscriber line) available to competing operators and enables the development of complementary network devices and services among a larger number of competing firms such as fast Internet access and IP telephony. Despite its popularity among regulators, however, local loop unbundling is still little used by operators in most countries.

In the paper we set out to explain this paradox. We argue, based on a transaction cost cum strategic analysis of the parties' incentives and the transactions involved, that regulatory enforced LLU contracts supported by regulated cost-based pricing, suffer both from infrastructure investment disincentives and inefficient contractual safeguards against the associated transaction hazards. The end result is intrusive regulation, which neither helps the new entrant nor provides much incentive for the incumbent to invest.

In particular, a new "small" entrant using mostly unbundling assets lacks staying power. Shocks to its costs, whether opportunistically made by the incumbent or the result of exogenous factors, could easily drive it to bankruptcy. Knowing the potential to be left stranded, customers will not flock to the new entrant. Similarly, given the difficulties in separating opportunistic from exogenous cost shocks, new entrants will utilize the regulatory process to keep their costs down. Incumbents' optimal strategy, similarly, is to use the regulatory process to keep the new entrants costs up.

This makes LLU most often non-viable as a business model for local network operations, and represents in our view the most fundamental explanation for the resounding failure of local loop unbundling. The recent popularity of UNE-P, unbundled network element-platform, which provides competitors with the ability to essentially obtain resale of local services from "bottom-up" costs rather than at a "discount from retail," has been suggested as evidence of the potential success for unbundling. We claim, instead, that the popularity of UNE-P is driven more by the decision of the large IXCs to enter the local market, a decision that was on hold as long as the long distance market was worth protecting. The collapse of the long distance market, then, generated demand to reduce prices for UNE-P, and thus promoted the entry of the large telecom players. LLU, still, remains a non-working proposition for new or specialized telecommunications operators.

The Norwegian case may illustrate a potential solution to the above problem, but is also more difficult to generalize. In this case, the same dedicated investments that cause transaction hazards may also help to solve the problem once the investments are made. By

investing in incumbent-specific assets and thereby becoming a quasi-hostage of the incumbent, the entrant may signal its intention of behaving “appropriately,” meaning remaining small and not attempting to obtain too much market share. In this situation, with moderately entry-friendly regulation, the incumbent may prefer accommodation than to fight. As long as the entrant does not attempt to capture too large a market share, letting competitors capture some part of the market effectively eliminates the threat of heavy-handed price regulation, and the costs associated with fighting it.

On the other hand, the hostage effect cannot be that big, since extreme outsourcing that minimizes the entrant’s financial risk also reduces its dependency on the incumbent. Thus, additional explanations are called for. The incentives of the publicly owned company to follow governmental instructions, its peculiar prior investment in ISDN and its consequent lack of attention to the DSL market, and the collaborative niche strategy played by the entrant, all contributed to the entrant’s success in capturing an unusually large market share. Certainly, other public operators will not follow the government line, nor overinvest in ISDN, nor postpone investments for fear of cannibalization in the face of competition. Thus, the Norwegian case may remain as one of strategic failure and regulatory compliance by the public corporation Telenor more than the success of a regulatory or entry approach as such.

## 1. Introduction

There is a paradox in “local loop” regulation. Despite its enduring failure, regulators are steadfast in their determination to promote telecommunications service competition by means of local loop unbundling (LLU). Unbundling, in principle, makes the local loop (subscriber line) available to competing operators, thereby enabling the development of complementary network devices and services among a larger number of competing firms such as fast Internet access and IP telephony. Despite its popularity among regulators, however, LLU is still little used by operators in most countries. Examining and explaining this paradox is the purpose of this paper.

According to regulators and new entrants, both in the U.S. and Europe, it is not the concept of local loop unbundling (LLU) as such that is at fault for the lukewarm performance of LLU, but rather insufficient regulation and intransigent incumbent operators. As soon as LLU is properly priced and efficiently implemented and enforced, so the story goes, new entrants will prosper and profit. Increased competition will then lead to the much-desired effects of lower access prices, faster role-out of network and higher broadband penetration. Conversely, without strong regulatory enforcement of LLU, the beneficial effects of competition would be seriously delayed, and perhaps never attained. The recent seeming success of the so called unbundled network element platform (UNE-P) is supposedly the result of stronger regulation and more cost-based pricing. The recent FCC decision on unbundling (**Docket No.: CC 01-338, Press release dated February 20, 2003, order to be delivered in March) specifying criteria for states to determine whether UNE-P solves or not an “impairment” condition raises serious uncertainties about UNE-P based business models.**

Recent EC regulation (No 2887/2000) recognizes that “for Europe to fully seize the growth and job potential of the digital, knowledge-based economy, business and citizens must have access to an inexpensive, world-class communication infrastructure and a wide range of services” (L 336/4). To achieve this, member states were called upon to “work towards introducing greater competition in the local access networks before the end of 2000 and unbundling the local loop, in order to help bring about a substantial reduction in the costs of

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using the Internet” (L 336/4). Although the exact connection between LLU – whether of a UNE-P or regular nature - and the futuristic statements were never spelled out in detail, the implicit assumption is that there exists a sequence of strong casual relations from regulatory enforced LLU to increased competition and price reduction to infrastructure development and knowledge-based economic growth.

In this paper we challenge this optimistic view on the prospects of Local Loop Unbundling both for voice and high-speed data markets. We argue, based on a transaction cost – cum strategic analysis of the parties and transactions involved, that regulatory enforced LLU contracts supported by regulated cost-based pricing, will suffer both from infrastructure investment disincentives and inefficient contractual safeguards against the associated transaction hazards. This makes LLU most often non-viable as a business model for local network operations and represents the most fundamental explanation for the failure of local loop unbundling.

We start our examination of these issues in section two by presenting a theoretical model of local loop unbundling. Different LLU varieties are described in section three. In section four we examine the essential facility attributes of the local loop, particularly after technology has enabled the transformation of narrowband copper lines into broadband digital subscriber line (DSL). In section five we continue our transaction cost analyses of LLU with a focus on DSL unbundling. Preliminary experience from DSL unbundling is examined in section six. Evaluation and recommendation finalizes the paper in section seven.

## **2. The LLU Model in Theory and in Practice**

The “local loop” is – so far - the physical twisted metallic (copper) pair circuit in the fixed public telephone network connecting the network termination point at the subscriber’s premises to the main distribution frame or equivalent facility. Local Loop Unbundling (LLU) is the process where the incumbent operator, such as Telenor in Norway, BT and Kingston in the UK, or any of the RBOCs in the U.S., makes the copper cables that run from customers premises to the telephone exchange available to other companies. There are endless variants of LLU.<sup>1</sup> Three are the most common: LLU proper, UNE-P and line-sharing. Under LLU proper, other licensed operators (OLOs) lease a physical line, and may have physical access to

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<sup>1</sup> We discuss these in more detail in the next section.

facilities in the local exchange company's central office. They could then connect their own equipment, and even upgrade the individual line – if feasible - to provide DSL services to their unbundled customers. In the US, OLOs may use unbundling of the incumbent's switching and transport facilities to connect the incumbent's –unbundled- local loop to their own point of interconnection in the incumbent network, so as to provide the final customer local telephone service. Under UNE-P, OLOs essentially rent a bundled service which includes not just the local loop but also switching and some transport, delivering calls to an interconnection point, which could be real or even virtual. With line-sharing OLOs lease just the high frequency spectrum of the line, connecting then their own equipment to the local loop so as to use DSL technology to offer services such as always-on high-speed Internet access, direct to the customer, while the local operator retains the voice segment. UNE-P is not completely consistent with DSL provision, as an OLO using UNE-P may not have access to the physical facility as it would have if it simply undertook full LLU. UNE-P is not essentially different from resale, except that in the US resale is priced at retail minus avoided cost, while UNE-P is priced at “cost.”

By making the local network available to other companies, a larger number of players are, in principle, allowed to compete in developing complementary facilities and value-added services, leading, thus, to higher network utilization and increased revenue from the local network. As the sole owner of the local exchange network the incumbent may benefit from increased local exchange traffic. As a competitor, however, it may not benefit equally well from providing complementary facilities and services in other parts of the value-chain. Besides, most incumbents also fear that regulated prices on unbundled elements will eliminate the potential profit from increased local traffic. Consequently, most incumbents tend to regard local loop unbundling more as a threat than as an opportunity. If they didn't, local loops would have been unbundled voluntarily years ago. Instead, unbundling of local loops has been regulatory-enforced at regulated prices.

Regulation-enforced LLU is necessarily a *hybrid* governance form. It mixes regulation with market contracting. Available pure forms range from market contracting via collaboration, corporation and regulation to public bureau. These pure forms differ with respect to the use they make of various control, incentive and conflict resolution mechanisms. Market contracting supports autonomous adaptation by combining high-powered incentives, weak administrative control and legalistic conflict resolution. The remaining forms, from

collaboration to public bureau via corporation and regulation, increasingly support coordinative adaptation by combining increasingly stronger and more elaborate formal and informal controls with increasingly lower-powered incentives under less legalistic conflict resolution regimes. In comparison with market contracting, for example, the corporation is characterized by stronger administrative and more elaborate social control, along with lower powered incentives and less legalistic conflict resolution mechanisms, while collaboration takes on intermediate values. Compared with private firms, public bureaus are the polar opposite in all of these respects, while regulation is located in between these two along all dimensions (with the caveat that regulation may have more administrative controls, possibly of a dysfunctional kind).<sup>2</sup>

Transaction costs minimization is assumed to be the main, but not the only, objective of alternative governance forms. The capabilities and facilities that transacting parties already have will also influence the choice of governance form. If one of the transacting parties already owns specialized and highly productive production assets, such as the “local loop,” renting (contracting) rather than acquiring the capacity (corporation) or building their own facility (corporation) is likely to be chosen as the initial alternative to save time and production costs despite significant transaction hazards associated with the supply of such capacity. Transaction costs are the costs of running the transaction. They include the ex-ante costs of drafting, negotiating, and safeguarding an agreement and, more especially, the ex-post costs of maladaptation and adjustment that arise when contract execution is misaligned as a result of gaps, errors, omissions, and unanticipated disturbances (Williamson, 1986).

Factors causing transaction hazards and investment disincentives include both attributes of the players such as opportunism and bounded rationality and attributes of the service transactions such as incompletely specified contracts, dependency relations and asymmetric information.

To a large extent, transaction costs are caused by people’s inclination to behave opportunistically; that is, to mislead, deceive, obfuscate, and otherwise confuse in a calculated and self-interested way.<sup>3</sup> Without such transaction hazards, contracts could have been designed that would have both contributed to more efficient utilization of available network capacity (static efficiency) and to more efficient development of new facilities and services

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<sup>2</sup> Williamson, O.E., 1999 “Public and Private Bureaucracies: A Transaction Cost Economics Perspective,” Journal of Law, Economics, and Organization, April, 15, pp. 306-

<sup>3</sup> Williamson, O.E., 1986, Economic Organization, Wheatsheaf Publishing Ltd., Brighton, England, 1986.

(dynamic efficiency). This would have protected the incumbent from exposing its assets to regulatory expropriation, and eliminated the incumbent's incentives to actually abuse its power. In situations characterized by incomplete contracting between bounded rational and opportunistic actors, interdependency caused by large investment in partnership-specific (non-redeployable) assets hinders market transactions.

The performance effects of different governance forms, then, such as regulatory enforced LLU, will depend on the way governance-transaction alignments affects transaction costs and investment incentives.<sup>4</sup>

Transaction problems that prevent the parties from writing mutually beneficial contracts may also affect investment incentives negatively. Since all unbundling contracts, as complex as they may be, are necessarily incomplete and therefore open for periodic renegotiations, the *ex-post* return on the entrant's investments in its own facilities and capabilities may depend more on the parties' relative bargaining power in the contract execution phase than on the value created by the new entrant's investments and operational efforts.<sup>5</sup> As the owner of a low-cost DSL access to the end user mass market, the bargaining power of the incumbent in a market transaction is strong and that of the new DSL entrant correspondingly weak unless the new entrant possesses unique complementary assets of similar economic importance as the local loop, or can move the transaction to an arena in which it has a stronger bargaining position, like regulation. Not all new entrants during the 1990s had such unique complementary assets. Some, however, as the large long distance companies and the large content providers such as Time Warner, Disney Company could have substantial complementary assets of great value.

Unbundling the local loop can either be used as a temporary or as a more permanent measure depending on the extent by which other facilities substitutable to the unbundled elements are expected to arise or not. Permanent unbundling of facilities at cost oriented prices can only be justified if three conditions are met: first, those facilities are owned by a single operator; second, a new entrant will not be able to compete without access to those facilities, and third,

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<sup>4</sup> A transaction occurs when a good or a service is transferred across a technologically separable interface such as the one separating local loop from switching or the ones separating lower-layered basic infrastructure that produces switching and transmission from higher-layered applications that produce value-added services. Being technologically separable indicates that the respective activities also are candidates for being organized in separate firms. Technological inseparability would imply team organization.



these facilities are economically non-replicable.<sup>6</sup> In the temporary case where unbundled elements are eventually no longer non-substitutable, the intention of regulated based LLU is to jump-start competition by providing lower-priced unbundled access (e.g.: priced at some cost measure) to be, in principle, combined with the new entrant's – or other operators' - higher-priced private facilities as these are subsequently rolled out.

In the permanent case, where the unbundled elements are expected to be permanently non-substitutable, the intention is not to develop competition in the local loop itself, but to make local loops available to potential service competitors on equal terms. This would strengthen local loop utilization incentives more than local loop investment incentives, causing various operators to compete in developing superior facilities and service capabilities. Such competition may develop both on higher infrastructure layers (e.g. xDSL modems, switching, multiplexing, mobile-fixed integration, packet-switched IP telephony etc.), and in other parts of the value-chain (e.g. business solutions, web-hosting, content provision etc.). Thus, unbundling could be a viable business model for an entrant if either competition is highly profitable in complementary facilities and services,<sup>7</sup> or unbundled facilities are offered to competitors at prices that are lower than retail minus avoided costs.

To profit from their investment in network equipment, unbundled facilities, service development, marketing and the like, LLU operators (and DSL operators in particular) depend on the incumbent's continuous supply of low-priced local loops and related facilities, backhaul and interconnection services. Although such dependence limits a new entrant's financial exposure early in life, it does not eliminate it.<sup>8</sup> By renting as much equipment and lines as possible from the incumbent and other competing long-distant operators, the DSL/unbundle operator minimizes the size of potential financial losses, but maximizes

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<sup>5</sup> Hart, O. and J. Moore, "Property Rights and the Nature of the Firm", with J. Moore, *Journal of Political Economy*.

<sup>6</sup> This is called the essential facilities doctrine. The US Supreme Court *Terminal Railroad* decision of 1912 is normally seen as the origin of the doctrine. See Pitofsky, Robert, "The Essential Facilities Doctrine Under United States Antitrust Law," undated mimeo.

<sup>7</sup> Competition in complementary facilities and services could be highly profitable either because the entrant is very efficient or because the complementary market is not sufficiently competitive.

<sup>8</sup> "In today's market climate operators have problems finding the resources to enable them to make the up-front investments which are required if you are going to make a success of LLU," accedes John Dickie, Head of Regulatory and Corporate Affairs at ECTA; "you've got to find a substantial amount of money to allow you to collocate your kit, to make the initial payments in order to get into exchanges and the payments for each line you have unbundled to attach to your equipment." (As reported in Public Network Europe, June 2002, Volume 12,

simultaneously its dependency on other suppliers and thereby also the transaction hazards associated with such dependency. Even super-light DSL or UNE-P operators cannot avoid becoming operationally as well as economically dependent on the local loop operator, and even more so as they expand their networks and accumulate expenses that can only be recovered from subsequent sales of network services. As they get increasingly locked into the network and service apparatus of the incumbent, unbundling operators are also becoming increasingly vulnerable to potential service hold-up and margin squeezing.

The renting out of these facilities to OLOs, whether DSL or others, who are also investing in non-contractible intangible assets generates a dependency on the incumbent's local copper loop. Total dependence makes the stand-alone value of the, for example, DSL operator's investment close to zero, and its negotiated share of DSL revenue correspondingly small. Normally this would be enough to deter investment in the first place. For those who take the risk, excessive transaction costs will ensue, unless appropriate safeguards can be found. Unbundling regulation, is one such safeguard. The new entrants' demand for regulatory help, then, has both a rent seeking as well as an investment protection rationale. But the regulatory safeguard is neither perfect nor comes without costs, both for the entrant as well as for the incumbent. Furthermore, unbundling regulation is also not the only safeguard.

In the general case, unified ownership and corporate governance would provide, although at a bureaucratic cost, some of the required transaction safeguards. Unified ownership implies that the entrant either directly invests in the local loop – i.e., becomes what is known in the US as a facilities-based operator, or that the incumbent buys the entrant. It could be argued that in its strongest form regulatory enforced LLU resembles the corporate mode in many ways. First, the property right regime of LLU has some resemblance and similar disincentives implications as compensated expropriation of private property.<sup>9</sup> The governance structure of regulatory unbundling resembles, though, the divisionalized company with its partly cooperating, partly competing, subsidiaries. Whereas general management authorizes the terms and conditions regulating intra-firm transactions in divisionalized

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No. 6, 30-34, "Unbundling: still behind bars"). Furthermore, transferring network equipment and rental obligations to competing entrants requires such entrants to be easily available on short notice.

<sup>9</sup> Recall that incumbent operators must grant access, for regulated compensation, to its network assets. In principle, the compensation must be "compensatory."

companies, regulating agencies decide, in principle, and subject to extensive litigation, on the terms and conditions regulating inter-firm transactions in regulated industries.

In fact, efficient LLU regulation may be defined as those regulatory measures that manage in a net beneficial way to correct the investment disincentives associated with LLU and eliminate transaction costs that otherwise would have caused unregulated private actors to under-invest in the local loop and under-utilize its capacity. Efficient regulation, though, is another fiction as is costless transacting. Extra costs in terms of regulatory supervision, politicization and manipulation of the regulatory process and associated regulatory games are unavoidable. These extra costs, though, have the potential to eliminate its potential benefits. LLU, then, has an unavoidable trade-off. To make it work, heavy regulatory intervention is required. But the heavier the regulatory intervention, the higher the regulatory costs, which diminish the private benefits associated with LLU.

Indeed, the stronger the need for regulatory supervision, the stronger the need to protect the incumbent against arbitrary regulatory decision-making. The need to protect against arbitrary regulatory decision making in the presence of substantial uncertainty about technological, economic and behavioral issues implies that regulation is going to be cumbersome and protracted. Regulatory complexity provides perverse incentives, both for entrants and incumbents. Entrants will request “equal treatment” from the incumbent, but in fact will be demanding preferential regulatory treatment.<sup>10</sup> Similarly, incumbents will allege that entrants’ requests are confiscatory. Thus, if LLU is enforced via regulation it will have a large potential for delay, obfuscation, and in general for the strategic manipulation of the regulatory process, both by the incumbent as well as by the entrant. Thus, while leaving LLU to the exclusive domain of private negotiation may lead to entry only insofar as the incumbent benefits from the revenues generated by the new entrant, moving LLU to the regulatory process may not generate a very different competitive outcome. It will, however, generate higher demands for entry accompanied by higher regulatory costs. This regulatory process is

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<sup>10</sup> A case in point is quality of service. Non-discrimination regulations will normally require incumbents to treat new entrants in the provision of LLU as they would treat their own retail customers. New entrants, however, will use complaints to regulatory agencies as way to actually achieve a “better than average” treatment. Discerning whether an incumbent treats entrants different than retail customers requires a statistical and probabilistic (rather than actual) assessment which is made slightly difficult because of the small size of each new entrant. After all, the probability that a 5% of 2000 lines will have, say, more than a two day delay in delivery has to be higher than the probability that a 5% of two million lines have the same delay.

equivalent to a roulette that grants with some probability, and after spending certain regulatory costs, a below cost access to facilities to new entrants.

New entrants whose business plans are based on LLU, then, are exposed to substantial regulatory and economic uncertainty. The more they depend on regulation-induced LLU, the higher their exposure to regulatory risk. This rather contentious trade-off inherent to local loop unbundling has hitherto not been properly recognized, nor has its ramifications been properly examined. It is, though, a main factor explaining the seeming paradox that unbundling is much discussed, but little used.

The exposure to regulatory risk will change as a new entrant grows and develops its own unique facilities and service capabilities. From the beginning, however, the incumbent controls the customer access that makes this possible. An incumbent will normally be unwilling to surrender this control as long as it does not believe that the new entrant can develop anything that its own subsidiaries cannot do equally well or even better. The implicit threat of withdrawing or restricting high-quality customer access, can be an instrument to increase its local loop charges and thereby its share of the residual surplus. The new entrant's share of surplus will be correspondingly reduced, reducing its investment incentives. Consequently, a new entrant would be reluctant to invest in irreversible assets unless the incumbent's right to withdraw local access or lessen its service quality is sufficiently restricted and the entrants' user rights correspondingly strengthened.

Acquiring the local loop, and ancillary assets, would imply such a transfer of user rights, but so would, in principle, regulation-enforced LLU along with ex post regulatory supervision that may help to reduce transaction costs in the contract execution phase. In this instance, regulation imposes not only unbundling requirements on incumbent operators. It also defines cost oriented prices for unbundled elements, along with service level obligations, compensations for overpricing, service failures and delays, as well as dispute resolution and appeal rights. The transfer of user rights at cost-based prices will improve the ex-ante investment incentives in complementary facilities and services in that regulatory governance may help to reduce the ex post transaction costs in renting unbundled network elements.

The transaction hazards normally associated with regulation, however, are exacerbated in the LLU case. The contracting parties are also competitors. To be useful to their customers,

competing network operators have to cooperate so that subscribers of one network may call subscribers of the other. This would not cause extra transaction costs as long as accessing the other network would not allow one operator to capture the subscribers of the other operator. Such capture is, however, exactly the very intention of LLU. By granting the entrant the right to rent the incumbent's network at favorable prices, regulation-enforced LLU allows the contracting parties to cooperate closer in order to compete harder. In most normal business relations this will cause excessive, if not prohibitive, transaction costs. Choosing competition without cooperation or cooperation without competition solves the problem.

In the telecommunications sector, however, neither seems to satisfy the needs of new entrants or public officials. Regulating the cooperating competitors has been, so far, the preferred solution. Regulating transactions among cooperating competitors means applying governance mechanisms (i.e.; incentives, controls, conflict resolution) similar to those applied by corporations in handling transactions among its subsidiaries. Crucial differences exist, though, in terms of competition being harder and less reconcilable, and governance being more complex, compromised and politicized for regulated than for incorporated operators.

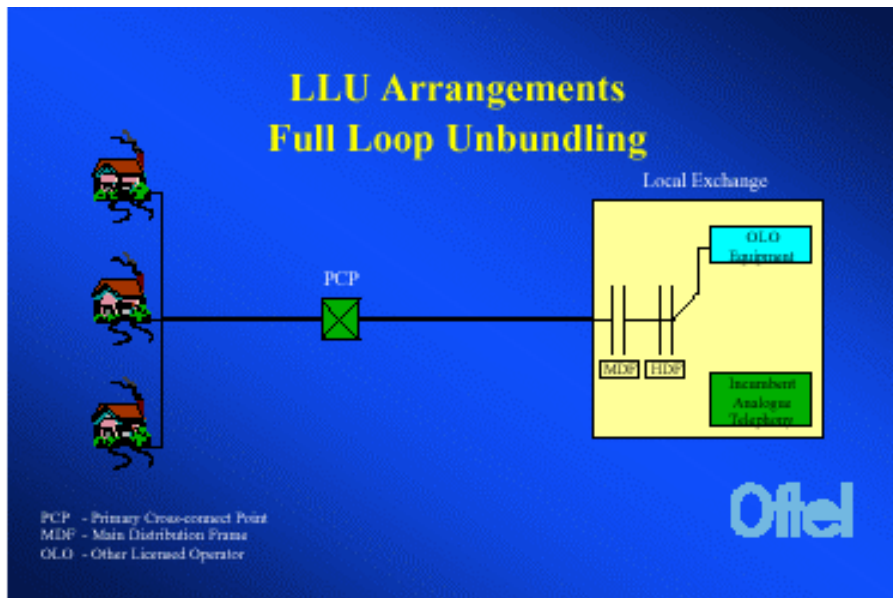
### **3. LLU Varieties**

There are a number of options available for gaining access to the local loop depending on what elements of the local loop are offered as unbundled elements and where the entrant chooses to locate its equipment. Prior to unbundling, each pair of copper wires run from the customer's home to the primary connection point (PCP). The PCPs are cabinets located at the side of the road connecting the wires from the customer's home to a pair of wires from the main distribution frame (MDF),<sup>11</sup> which in turn may be located inside the exchange or at some intermediate point between the PCP and the exchange. Prior to unbundling, the MDF are then connected to the internal exchange equipment.

#### **Full Local Loop Unbundling**

After full unbundling the wires in the external cable are connected via an internal tie cable from the MDF to the handover distribution frame (HDF), which is adjacent to the OLO's own switching and/or transport equipment (see Figure 1). The HDF is used to terminate the cable from the exchange and to make the pairs available to the operator. The location of an

entrant's equipment in a site can either be within a hostel, a room that is built to a standard design to house a number of operators, or in a bespoke arrangement.<sup>12</sup> Under distant location, the entrant houses its equipment away from the incumbent's building and uses a tie cable to connect the incumbent's exchange with its remote site. The remote site can be a building or a small cabinet on the side of a road.



**Figure 1. Local Loop Unbundling**

### Line Sharing

Line sharing is a form of local loop unbundling where the incumbent and an OLO share the same line. From the MDF the wires are connected to a splitter (which separates the frequencies for voice telephony and those for higher bandwidth services). The incumbent provides voice telephony over the lower frequency portion of the line, while another operator provides DSL services over the high frequency portion of the same line. Consumers can now acquire data services from a new operator while retaining the voice services of the incumbent.

### Sub-loop unbundling

Both EU and FCC regulations require that other operators can interconnect with the local access network at a point between the incumbent's site and the end user. This arrangement is

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<sup>11</sup> In England, the PCPs are easily discerned in the streets by their green color. In the US no such color regulation is in place, but they tend to be painted utility gray.

referred to as sub-loop unbundling. In sub loop unbundling the connection point is a PCP. Sub-loop unbundling can be used for emerging technologies such as VDSL where the equipment needs to be much closer to the home to deliver very high bandwidth services. An optical fiber would deliver the high-speed services to the local PCP and VDSL used to send them along the copper pair to the consumer's premises.

Even after being made mandatory by the EU in December 2000 and four years earlier in the US,<sup>13</sup> LLU developed rather slowly in both the United States and in the EU member countries. In the EU, incumbents in several countries had voluntarily started to develop alternative access products to please regulators' repeated requests for open network provision. Although resembling local loop unbundling, these access products are mainly different ways of selling network capacity such as bitstream access in the local loop and roaming in the wireless network. A common feature of all of these access alternatives is that the network owner avoids transferring user rights over the network to the same degree that it would under local loop unbundling. In the US, the Ameritech Corp. proposed, prior to the 1996 Act, to unbundle its network as a way to get the state regulator to agree to allow it to provide long distance services.<sup>14</sup> This plan, which was never introduced, was the blueprint over which the 1996 Act unbundling requirements were based.

Under current regulations in both the US and EC, operators with significant market dominance in the EU and incumbent local exchange operators in the US, must be prepared to surrender most of their user rights to their local network.<sup>15</sup> Regulations provide entrants with the right of "using" (in the sense of renting, sharing or reselling) the incumbent's local loop and its related facilities. Since such a competitive LLU-contract would stimulate the development of subscription and associated services more than the development of new

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<sup>12</sup> At British Telecom the basic unit of capacity of a hostel is the "equipment bay". In the standard hostel arrangement the unit of space is a three rack bay which has a footprint of 1.8m x 0.8m and a total area, including circulation space, of 10m<sup>2</sup>. This area is separate from the incumbent's operations.

<sup>13</sup> LLU is mandatory in the US since the passage of the 1996 Telecommunications Act. The Act mandated the FCC to implement a process of opening up the local network to competition. This process has been highly contested and is still in process. Nevertheless, the FCC decision of August 1996 is perceived as the opening salvo in the unbundling wars.

<sup>14</sup> This was the essence of the so-called Customer First Plan. See, Teece, David, *Telecommunications in Transition: Unbundling, Reintegration, and Competition*, 1 MICH. TELECOMM. TECH. L. REV. 47 (1995).

<sup>15</sup> The recent FCC decision on unbundling, however, raises questions about the future general applicability of prior unbundling requirements. In particular, the FCC determined that line-sharing is not any more an unbundling requirement, and stipulated particular process for the requirement to be withdrawn. Furthermore, it delegated to the States, in the same way as the EC directive does, the decision on whether or not a particular network element should be unbundled based on the "impairment" concept.

infrastructure, a return-on-investment charge will have to be included in the LLU charges to ensure the long-term development and upgrade of local access infrastructure.

#### **4. Should Line Sharing Be Required?**

The FCC decision to “deregulate” line-sharing, and the dissent on this issue of Mr. Powell, the Commission’s Chairman, raises the question whether not-requiring line-sharing unbundling is the right policy approach.<sup>16</sup> Digital Subscriber Lines are a recent innovation enabled by advances in digital modem technology. Interactive data processing modems connected at both ends of the local copper loop are able to pack and send data at various high-speed rates (xDSL). Narrow-band and low-speed copper lines are thereby turned into broadband and high-speed digital subscriber lines. In this case, the same advances in modem technology that unexpectedly turned narrowband into broadband, turned local loops into more direct competitors of other broadband delivery networks, like cable or satellite.

Until quite recently, however, a range of possible technologies was considered future viable access alternatives. These consisted of broadband wireless local loop (B-WLL), next generations’ mobile access (2.5G, 3G, 4G, etc), power line modems, cable-TV modems, satellite broadband and fiber optic local networks.<sup>17</sup> As it turned out, in spite of the recent hype with WiFi,<sup>18</sup> B-WLL became significantly messier and costlier to build and maintain than expected;<sup>19,20</sup> next generation mobile access is delayed, but still a very promising

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<sup>16</sup> For Mr. Powell’s dissent, please see [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-231344A3.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-231344A3.pdf).

<sup>17</sup> See Spiller, P.T. and B. Zelner, “Product Complementarities, Capabilities and Governance: A Dynamic Transaction Cost Perspective,” *Industrial and Corporate Change*, Vol 6, No. 3, 561-594, (1997).

<sup>18</sup> A good source of information on Wi Fi is the Wi-Fi Alliance web site, <http://www.weca.net/OpenSection/index.asp?TID=1>.

<sup>19</sup> According to Stuart Little, Director of Broadband Product Marketing at DMC Stratex Networks “but there’s an issue that the companies have been overlooking: the current broadband wireless technologies do not support a viable business.”. Indeed, Little blames “the cost of installing the systems, the cost of ‘roof-top real estate’, and the cost of servicing the systems”, and concludes, “the fixed-wireless access market is a pretty bad story.” He concedes “there is a market, but it’s very small”, adding that “from our point of view, it’s just not worthwhile. I am not particularly convinced that this technology is going to be successful in the longer term.” (As reported in *Public Network Europe* (February 2002, Volume 12, No. 2, 24-27; “Access: crooked keys to the local kingdom”).

<sup>20</sup> The Eastern Management Group has, however, a slightly more optimistic view on B-WLL particularly in less densely populated markets. In its 2002 Competition Report it states that although there are still technological problems, “[it] believes that fixed wireless offers the greatest opportunity to disrupt the current broadband environment. ... New technology, which obviates line-of-sight obstacles, could wipe away many of the problems that face service providers today. Self-installation, a boon to the cable and DSL sectors, is expected to take off as well, making the service more consumer-friendly, installation timelier and will bring down costs...The Eastern Management Group expects that Independent Operating Companies (IOCs) may be the next big adopter. Smaller incumbents must hang on to their residential customers as they face mounting competition from satellite providers and other carriers. To do this, it is imperative to provide “bigger pipes” to customers, but DSL or



alternative; power line modems are not yet successfully developed;<sup>21</sup> cable networks are working well, but are not yet ubiquitous in all jurisdictions; satellite broadband although growing, may only be a force in rural areas;<sup>22</sup> fiber optic cable is the alternative with highest speed and capacity, but also the most expensive. All of these, except power modems, still have significant development and sales potentials, but few have the potential of DSL in becoming the preferred mass-market broadband access alternative in nearest future (3-5 years). Cable is the closest substitute in countries with high penetration such as the US, but upgrading costs have been very high bringing most European cable companies close to bankruptcy.<sup>23</sup> As long as best access alternative is substantially more costly (B-WLL or Broadband Satellite) or less speedy (GRSP) or locally unavailable (cable), entrants interested in providing DSL service will continue to be highly dependent on unbundling the local loop, whether from an incumbent or entrant.

In short, whereas advances in alternative access technologies have made the local loop more replicable, advances in DSL technologies may have made its broadband features less replicable. Consequently, regulatory enforcement of LLU for line sharing purposes may be more pertinent than LLU for supporting the development of competing access. In more populous markets where the local copper loop can be more readily substituted with alternative access (e.g.; cable, fixed-wireless, fiber optic network), LLU for line sharing purposes will naturally lose its rationale. Competition will set limits to the local operators' ability to extract rents in the broadband market. Nevertheless, in environments in which cable is unavailable, the original rationale of unbundling the loop for DSL purposes, i.e., line-sharing, may still be valid.<sup>24</sup> LLU as a way to provide support to broadband competition, however, also shows

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FTTH rollout is just not economically feasible for a high percentage of rural ILEC subscribers. The Eastern Management Group believes that fixed wireless may provide an excellent bridge technology for these carriers.”<sup>21</sup> Utilities Local Exchange Operators may find it more profitable to operate in less dense areas, in which case they will compete more directly against broadband satellite operators than local exchange operators. Also, Europe may face faster growth in powerline communications because of alternative infrastructure in the power grid. See Eastern Management Group, 2002 Competition Report.

<sup>22</sup> By the end of 2002, broadband satellite customers number half a million in the US, with almost half a billion dollars in revenue. See Eastern Management Group 2002 Competition Report.

<sup>23</sup> Ivan Verbesselt, Chief Technology Officer of Alcatel's DSL business unit, says that successive generations of DSL technology may yet influence the balance of power between ILECs and CLECs in the DSL arena. He notes that the latest product releases increase the coverage of enhanced loops and the number of subscribers supported in a central office, citing the principles of 'Moore's Law' at work in DSL product development. At the same time, the ability to support services other than high-speed Internet access is increasing.” (As reported in Public Network Europe (February 2002, Volume 12, No. 2, 24-27; “Access: crooked keys to the local kingdom”).

<sup>24</sup> The fact that cable model availability and DSL availability is not universal throughout the operators' networks, constitutes not just a cost issue but also a strategy issue. A local exchange operator which upgrades its network to provide DSL services has the potential of losing revenue because of a subsequent drop in line subscriptions.

substantial regulatory transaction hazards. These hazards may prevent LLU from developing into a viable business model.

## **5. Will DSL Unbundling Cause Excessive Transaction Costs?**

The very high value that most governments place on broadband competition has made regulation-enforced LLU the preferred outcome over corporate integration. Such a choice priority is likely despite the fact that significantly higher transaction costs (including extra regulatory costs) will normally be involved.

First, a relative strong form of opportunism will tend to characterize the relation among transacting parties who are also competitors. In these instances, hiding and distorting information will be part of the game. The optimal response to opportunistic behavior is more of the same. A naïve reader of regulatory proceedings may come to the conclusion that opportunistic behavior characterizes incumbent and not entrants. More often than not, it is the incumbent who is accused of regulatory misconduct. These accusations have some theoretical support. Since the incumbent has significantly more to lose and therefore more to hide than the entrant, the incumbent will also have stronger incentives and more opportunities to behave opportunistically. In addition, its monopoly experience will make the incumbent more hostile to competition than most new entrants without a similar monopoly past. For all of these reasons, it is not the entrant, but the incumbent who develops the reputation for being recalcitrant and obstructive.

New entrants, however, have similar incentives to behave opportunistically vis-à-vis the regulator. Since it is normally difficult to ascertain costs and behavioral intent, new entrants will have all the incentives to claim misconduct by the incumbent as well as overcharge. New entrants will use regulatory threats as leverage to achieve better performance by the incumbent. Although the use of regulatory threats is not costless, costs fall unevenly on the incumbent and the regulator, rather than the new entrant. Incumbents must show that their costs are proper, that their conduct is flawless. Entrants must show none of the above. Faced, then, with opportunistic behavior by new entrants, the optimal strategy for incumbents is to behave similarly. Thus, opportunism is the dominant strategies of both entrants and incumbents.

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Thus, in the absence of competition from cable, a local exchange operator will have a diminished incentive to

Second, when transacting parties are competitors and behave opportunistically, any technical and operational difficulty will also represent an opportunity for delaying, misleading, obfuscating and otherwise behaving strategically. In highly complex, real-time interactive and interdependent systems, monitoring the cost and quality of each individual component and contribution will be extremely difficult, almost impossible. Technical performance data are often tacit, hidden and unequally distributed. Many LLU terms and conditions are therefore incompletely specified, and are getting even more so as the networks develop and technical complexity increases, including not only purely technical issues, but increasingly also economic, commercial, legal, and regulatory ones.

These issues imply that regulation-induced LLU contracting will be extremely hard to implement successfully. Consider the following technical problems inherent to an LLU transaction. A new entrant has a requirement for incumbent network information such as the availability of collocation space in particular exchanges, network topography, and the suitability of particular lines for LLU and DSL service. Line ordering, requests for number portability and cut-over dates have to be coordinated between the parties. The new entrant will then need to ask the incumbent for individual customer information such as billing name and address, current service status and history. For its part, the incumbent will require realistic forecasts of the new entrant's service uptake so as to plan collocation space and, possibly, additional backhaul capacity.

Interference, taking the form of electrical noise, cross talk and energy radiation, is possible between high frequency services such as ADSL and the legacy services such as HDSL and ISDN when they happen to be carried in the same cable bundle. Appropriate management of the frequencies and the power of signals running over individual pairs in a cable can minimize the incidence of such interference, but this requires cooperation between the new entrant and the incumbent that might be complicated by the contractual nature of some of the LLU options.

Collocation is an area fraught with potential conflicts of interest between the incumbent and the new entrant. Operational issues include the actual size of the space made available in the

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provide DSL than an OLO providing DSL via line sharing.

particular incumbent exchanges; the number of new entrants that might wish and allowed to populate that space; whether 'co-mingling' (cage-less collocation) is permitted; what types of equipment are allowed into the exchange building; the terms of access for OLO personnel; liability for damage; overall security; and whether the incumbent's exchange environment is adversely impacted by the collocated equipment in terms of factors such as air-conditioning, electrical supply and fire protection.<sup>25</sup>

Network trouble-shooting, fault repair and maintenance constitute a field ripe with possibilities for conflict. In the case of a fully unbundled loop, initial responsibility for fault testing of the whole circuit might reside with the new entrant. However, the new entrant must be able to ascertain whether the fault is within the incumbent's unbundled portion of the network, and so require remedial action from the incumbent. If the fault is located in the new entrant's own network elements, a different remedy is required.

LLU service availability and incumbent repair times can easily become controversial, particularly in an entrant-friendly regulatory environment. The US state regulators have been handling quality of service cases for several years now. European national regulators are also starting to face similar challenges. In April, for instance, the ART required France Telecom to provide the European MAN and fiber operator LDCOM with a guaranteed recovery time (GRT) for unbundled lines within 4 hours, 24 hours a day, 7 days a week. LDCOM had requested this GRT so that it could offer corporate service packages comparable to those of France Telecom. Prioritization of fault repairs to avoid discrimination against particular service providers is also relevant here.

Perhaps the biggest operational impediment to successfully implementing LLU is the incompatibility of incumbent and new entrant operational support systems (OSSs). The information contained in OSSs is critical to the administration, maintenance and updating of network services, and access to this information is key to the ability of the new entrants to compete via LLU. Incumbent's OSSs, however, were not developed so as to provide competitors with equal access, but rather to serve their own customers. As a consequence

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<sup>25</sup> In an effort to make collocation more workable, the UK regulator Oftel has recently both sanctioned unescorted OLO personnel access to BT exchanges in many cases, and halved the premium charged for escorted access in circumstances where an escort is still required. In the same OLO-friendly vein, the French regulatory agency, the ART, has ruled in favor of co-mingling in France Telecom exchange buildings where there is available space. In the US, all forms of collocation are by now standard unbundling requirements..

they remain clunky, bespoke and largely incapable of producing end-to-end flow-through results.<sup>26</sup> Interfacing these imperfect and often internally developed systems with those of the new entrants is a formidable task.<sup>27</sup> Technical complications, then, offer rich opportunities for hiding obstructive behavior.

Finally, accounting rules that define relevant cost base and cost allocation methods are notoriously dubious since no “correct” costing rule exists for costs that are mostly fixed and virtually non-affected by operations. Not unexpectedly, therefore, most incumbents are strongly opposed to opening the local loop to free and unconditional use by other licensed operators even at prices that cover relevant cost plus a reasonable return - simply because relevant cost may still not cover all costs. In particular, relevant cost will not include costs in the form of income reduction as traffic moves from alternative data lines such as ISDN to DSL before ISDN investments are fully recouped. Neither do relevant costs cover the future reduction in traffic income as voice traffic starts to migrate from circuit-switched telephony to package-switched IP telephony over DSL. Neither do relevant costs cover the costs of maintaining higher quality standards for competitors than for own customers.

Furthermore, since competition may cause destructive price wars, as most costs are fixed and marginal costs close to zero, this possibility provide another reason for obstructing competition. The potential for cannibalization and the possibility of price wars, motivate incumbent operators to defend their property rights. Delaying DSL investment and restricting subsequent LLU may turn out to be an optimal strategy.

The above discussion makes it clear that LLU, whether for line sharing or full LLU, is prone to have important transaction costs, of which regulatory costs are an important component. These high transaction costs may well be behind the slow development of LLU in both the EU and the US.

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<sup>26</sup> Their inefficiencies, though, may provide a competitive advantage to incumbents. Thus, the entrants’ claim that incumbents do not want to upgrade their OSSs so as to discriminate against them.

<sup>27</sup> Regulatory fights over OSSs have, therefore, taken place throughout the United States.

## 6. Preliminary experiences

### Europe

The failure of European LLU has recently been pointed out in surveys carried out by Cullen International in cooperation with European Competitive Telecommunications Association (ECTA) which shows that less than .02% of European incumbent lines are unbundled to new entrants 24 months after unbundling became mandatory in December 2000. Furthermore, such a minor achievement is, according to ECTA, also the main reason for the low, but growing, penetration of broadband digital subscriber lines (DSLs) in Europe, which by end of December 2002 was only 4% of all lines in use, or about 8.6 million lines in total. Indeed, the growth in DSLs in 2002 has been rather impressive (ca. 100%), although from a very low level. Only 15% of the 8.6 million DSL lines were retail connections provided by new entrants (resale) and only 5% were unbundled lines. That is, of the total number of copper access lines only .02% were unbundled lines by end 2002.

Commenting on the above findings, Phil Evins, ECTA Managing Director, stated

*"Local loop unbundling (LLU) is not working and too few National Regulators are providing the alternative DSL interconnect products necessary for a competitive retail market. Put simply, incumbents are extending their dominance from retail voice into the new broadband market." (ECTA, 2002).*

Furthermore, as pointed out by the CEOs of new entrant companies in a recent hearing on LLU, organized by the European Commission in Brussels (cited in ECTA, 2002): *"LLU is not working: partly due to the high up-front costs, but also because of the excessive pricing and provisioning delays by the incumbents. Indeed, and according to their own market analysis, the Commission stated in the same hearing that "while 6,000 local loops were being unbundled per week, incumbents are rolling out 65,000 DSL connections per week - ten times more."*

After having presented and commented on this rather disconcerting development of European LLU, ECTA offered the following conclusion: *"ECTA believes that we need a twin-track response by policy-makers: stronger enforcement of existing LLU law by both the European Commission and National Regulatory Authorities, coupled with new measures to introduce effective cost-orientated DSL interconnection" ... "If politicians, governments and regulators*

*do not show the political will to implement DSL interconnection now, there simply will not be a competitive broadband market in Europe,"(ECTA, 2002).*

<b>Table 1: Broadband</b>			
	<b>European Union (1)</b>	<b>United States (2)</b>	<b>Norway (3)</b>
<b>Main telephone lines (4)</b>	209 mill	190	3.26 mill
<b>Broadband</b>	8.3 mill (4%)	16.2 mill (8.5%)	0.17 mill (5%)
<b>DSLs in total of which unbundled</b>	6 mill 4%	5.1 mill 4.4%	0.1 mill 40%
<b>Cable</b>	2.1 mill	9.2mill	0.045 mill
<b>Other</b>	0.2 mill	1.7 mill	0.025 mill

(1) Ecta's Scorecard, end of May, 2002

(2) FCC statistics, end of June, 2002

(3) NextGenTel's estimates, end of August, 2002

(4) International Telecommunication Union, ICT - Free Statistics, 2001 (<http://www.itu.int/ITU-D/ict/statistics/>)

## USA

LLU started earlier in the USA than in most European countries. From 1996 onwards, the incumbent local exchange carriers (ILECs) were required to unbundle their local loops as well as other facilities. Local competition was part of the deal to gain admission into the long-distance business. Unfortunately, the Telecommunications Act of 1996 made the big potential entrants into local markets (the long distance carriers like AT&T, MCI, Sprint) also the big losers would they enter into the local markets, and, as a consequence, would the ILECs obtain entry into long distance. As a consequence, although there was much noise about entering local markets, the large potential entrants did not move. For example, by 1999, out of a sample of 10 large US cities, AT&T entered into the local market, on average, only after seven small competitors entered into the local market.<sup>28</sup> Since the FCC was not going to easily determine that effective competition existed without some of the major entrants in, the ILECs saw little gain from cooperating with entrants. Thus, although six years have passed since the ILECs lost their local monopoly status, new entrants have captured just around 10% of the local exchange market, measured by access lines. Furthermore, most of the growth in the CLEC's market share has taken place in the last couple of years. See Table 2.

<sup>28</sup> See FCC, Local Competition 1999, Table 4.2, available at [http://www.fcc.gov/Bureaus/Common\\_Carrier/Reports/FCC-State\\_Link/comp.html](http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/comp.html). The cities in this particular sample are New York (7th), San Francisco (9th), Los Angeles (11<sup>th</sup>), Chicago (3th), Miami (8th), Washington DC (6th), San Diego (10th), Boston (10<sup>th</sup>), Detroit (6<sup>th</sup>), and Philadelphia (6), where the number in parentheses mean the order of AT&T's entry into that market.

<b>Table 2: End-User Switched Access Lines Reported</b>				
<b>Date</b>	<b>ILEC Lines</b>	<b>CLEC Lines</b>	<b>Total Lines</b>	<b>Share in %</b>
<b>Dec-99</b>	181,307,695	8,194,243	189,501,938	4.30%
<b>Jun-00</b>	179,761,930	11,557,381	191,319,311	6.00%
<b>Dec-00</b>	177,683,672	19,653,441	192,555,081	7.70%
<b>Jun-01</b>	174,485,706	14,871,409	191,760,433	9.00%
<b>Dec-01</b>	172,628,691	17,274,727	192,282,132	10.20%

Source: FCC Local Competition Report as of December 31 2001, July 2002, Table 1

Most entry, though, has been in the form of resold or unbundled local loops. As of December 2001, unbundled loops account for more than half of CLECs' lines, with own lines accounting for only 22% of their lines. The rest being resale lines. See Table 3.

<b>Table 3: Composition of CLECs Access Lines as of December 2001</b>		
<b>Resold</b>	<b>UNEs</b>	<b>Own Lines</b>
23.3%	54.8%	21.9%

Source: *ibid*

Much of the recent growth in CLECs' penetration, though, has been in the form of UNE-P (unbundled network element platform).<sup>29</sup> UNE-P lines account in mid 2002 for 60% of all CLEC's unbundled loops. The advantage of UNE-P over simple ULL is that UNE-P provides the CLEC with the ability to obtain the whole functionality of the ILEC network on a bundled form, rather than trying to piece it together in a piece-meal form. UNE-P does not require the CLEC to actually obtain possession of each line and to link it directly to its network. UNE-P lines then are not different from resold lines, except that prices for UNE-P lines (switching and transport) are based not on resale price minus x, but rather on FCC determined costs. UNE-P are substantially cheaper than resale, and easier to implement than just ULL. Thus, it is said, their fast growth.

<sup>29</sup> The unbundled network element platform is the combination of network elements (principally the loop, local switching and shared transport). See The UNE-P Fact Report, published by the PACE (Promoting Active



According to PACE, UNE-P account for 60% of the growth in CLECs' lines.<sup>30</sup> Since UNE-P penetration is accelerating,<sup>31</sup> the estimates of CLEC penetration may substantially change in the coming year. Furthermore, by August 2002, of all UNE-P lines, 57% were undertaken just by AT&T and WorldCom. The importance of UNE-P in CLEC's growth, and the role of the IXCs, though, are not separated. The collapse of the long distance market implies that the defense of the long distance market stopped being the fundamental regulatory strategy of the large long distance companies. Instead, the protection of the long distance rents moved to the offering of a bundled local-long distance service. As a consequence their decision to enter into local markets where resale at cost was present (essentially UNE-P). Their local strategy, then, precipitated their regulatory strategy, and as a consequence, unbundling took a second wind. Although unbundling remains highly contentious and risky for small CLECs, the large IXCs find unbundling to be both a useful regulatory instrument and a potentially transitory tool.

Advances in DSL technology also brought about substantial interest in line sharing in the US. With the unbundling requirements of the '96 Telecom Act, the FCC's TLRIC decision, and generous financing by optimistic investment funds and venture capital firms, numerous new entrants started large-scale deployment of DSL equipment. The expected growth in Internet traffic to be carried over DSL never materialized, though, and with the internet bubble burst and without sufficient traffic revenue to pay for installments and interests, most DSL operators went bankrupt, along with most competitive local exchange companies. **The level of High-speed lines (over 200 Kbps in at least one direction) have been increasing rapidly. By mid 2002 a total of 16.2 million lines (or wireless channels) in service from about 7.1 million at the end of December 2000, giving a penetration of just around 7%.<sup>32</sup> Of these 16.2 million lines, ADSL represents only 31%. Most high speed lines in the US are not DSL. Coaxial connections represent more than half of all high speed lines.**

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Competition Everywhere) Coalition. Available at [http://media.corporate-ir.net/media\\_files/NSD/ZTEL/presentations/UNE-P\\_Factreport.pdf](http://media.corporate-ir.net/media_files/NSD/ZTEL/presentations/UNE-P_Factreport.pdf)

<sup>30</sup> See PACE, *op cit*, p.2.

<sup>31</sup> For example, SBC's second quarter investor update reports that UNE-P's primary impact is in consumer segment, with 75% of access lines loss reflecting UNE-P offers. (see [http://www.sbc.com/Investor/Financial/Earning\\_Info/docs/2Q\\_02\\_slide\\_c.pdf](http://www.sbc.com/Investor/Financial/Earning_Info/docs/2Q_02_slide_c.pdf))

Although the level of LLU is significantly higher in the US both on narrowband voice line and broadband DSL lines due to an earlier start, the progress has been rather slow on both continents. In fact broadband penetration (including xDSL, cable, satellite/wireless) although almost double in the US (9%) by end June 2002 as in EU (4%) and Norway (5%) a year later, based on significantly more cable and less xDSL broadband in the US than in Europe, it is still not based on unbundling. Indeed, in the US the amount of DSL service based on line-sharing is minimal. Of the 5.1 million DSL lines, not even half a million are line-sharing lines.

In Norway, however, although 5% broadband penetration by end of August 2002 was slightly above the average EU level, the extent of DSL unbundling including line-sharing was, and still is, much higher. Indeed, unbundled DSLs account for close to 40% of total number of DSLs. Since Norwegian DSL unbundling so far can be considered a success (40% vs. 4-5% in the EU and in the US), we expect to find transaction cost mitigating conditions and mechanisms at work that are mostly absent in the other markets.

### **The Norwegian Case**

Before 2000 there was no unbundling of voice line in Norway, only pre-selection and capacity resale. The EC unbundling directive arrived in December 2000. In anticipation of this event, Telenor, the public telecommunications company, launched their ADSL service several months ahead. Among the few entrants that chose to start investing in DSL deployment, NextGenTel quickly arose to become the main challenger to Telenor (besides the multinational cable-company, UPC, in cable access). In only two years' time (as of July 2002) NextGenTel managed to develop into a company with 100 employees (plus 30 some hired hands) and 30.000 lines (mostly ADSL, and additional 5.000 – 10.000 in backlog). Having carried out a rather successful deployment and marketing strategy aimed both at the residential and the business markets, the company was less than two years after start of operation cash-positive (break-even) and rapidly growing.

Although there may be several plausible explanations for this unusual result, these will have to do with attributes that distinguish the Norwegian broadband operators and markets from those of other countries. In other words, explanations should not include time of entry,

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<sup>32</sup> See, FCC Trends in Telephone Service, May 2002.

production technology (xDSL technology on local copper loops), LLU contracting structure, available transport networks, and Internet penetration, since all of these are pretty much standardized or equally present across most Western countries. A plausible explanation would have to focus on the more unique features of the Norwegian setting concerning strategy choices, industry experiences and governance features affecting the relation between TextGenTel and its main supplier of local copper loops - Telenor.

In contrast to the large-scale deployment strategy of the US data operators, NGT carefully chose a niche strategy, starting first in the most densely populated areas with deployment of modular and scaleable DSL-racks. They also chose to outsource as much as possible of the network, including building facilities and operation services, cabling, installation and maintenance, but not DSL-racks, network monitoring, top management and the deployment of a small staff. Such an outsourcing strategy minimized their investment need and financial risk, but maximized simultaneously their dependency and thereby their transaction hazards in dealing with network operators and various service providers.

In the first role-out phase, Telenor chose, for several reasons, to delay and scale down its DSL deployment plans, leaving room for NGT to expand. Telenor had just finalized its nationwide, very ambitious and very costly ISDN investment program. Whereas 6-7% penetration was common in other European countries, Telenor decided to go for highest possible coverage, reaching about 35% of total lines in use. After having successfully accomplished such a large-scale investment program, starting on another competing investment program would only contribute to cannibalize ISDN long before its costs have been recouped.

Users, on the other hand, soon discovered the price-performance advantage of ADSL, and consequently started to migrate from ISDN to ADSL. Whereas consumers paid local per-minute-tariff plus a small yearly subscription price for the use of ISDN, they paid a fixed but still moderate always-on subscription price for ADSL, increasing in price with increasing broadband capacity. The first to move were home-office users and small-business customers, then a growing number of more moderate Internet users increasingly annoyed at slow ISDN speed and rising telephone bills.

Gradually Telenor was forced to take ADSL more seriously despite its cannibalizing effects on ISDN. The changeover from traditional per-minute pricing to subscription-only pricing

was nevertheless very painful. After having experienced the loss-making effects of ADSL, Telenor suggested to reintroduce volume dependent pricing. ADSL-users' reacted negatively, partly by signing on thousands of protests on a special Web page for the purpose, partly by threatening to switch over to NextGenTel who had promised to stick to its always-on subscription offer.

Despite extreme unilateral dependency, transaction problems did not prevent competitive entry; neither did they cause escalating costs in the post-entry phase. The deliberate choice of NGT of slow growth, a non-confrontational public relation approach and a flexible and integrative conflict resolution strategy, combined with Telenor's public ownership, may explain why.

NGT, to a large extent thanks to Telenor's placing its sight on a different market, eventually made substantial commitments to dedicated assets that made it dependent on Telenor for its supply of local loops. These investments not only created transaction hazards, but also created a quasi-hostage situation that motivated NGT to proceed cautiously and to solve conflicts in an integrative non-legalistic way.<sup>33</sup> Instead of letting the regulator or the court assist in resolving disputes with Telenor, compromises were deliberately sought through private negotiations whenever possible. In addition, NGT managers emphasized very strongly that outside the company "you should never talk negatively about Telenor; in fact, you should not talk about Telenor at all, if possible."

Sharing a piece of the market and a share of the monopoly profit with a friendly oligopoly is much to be preferred to a regulatory regime who threatens to set wholesale prices closer to long run incremental cost, significantly lower than today's price level. All of this helped to conserve a friendly relation with a publicly owned competitor that knew that he needed significant competition to please the regulator and avoid potential political and regulatory retribution.

The peculiar cooperative nature of Telenor can also be seen in its relation with the regulator. In March 2002 NGT asked Telenor for permission to renegotiate their prices for unbundled DSL. The parties started negotiation and Telenor ended up with offering a moderate but still

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<sup>33</sup> NGT's outsourcing policy implies that the risk of conflict would drive it rapidly towards bankruptcy.

significant price reduction. The regulator, however, was not satisfied with the result, as it did not fit the results from its own, and new, regulatory costing model for unbundled local loop. Without any explicit acceptance of the costing model as such, Telenor agreed to further price reduction, 25% in total.

In short, by pursuing a more aggressive deployment and regulatory strategy Telenor could have prevented competitive entry like most other continental incumbents did. Telenor, however, was initially disconnected from the market, and later chose the opposite strategy. Plausible reasons include both (1) a perceived low profitability of Telenor's ADSL investment in Norway because of the cannibalization effects of ADSL on competing ISDN investment, (2) an initially niche market strategy played by the entrant, coupled with (3) an integrative and non-legalistic conflict resolution strategy followed by the new entrant. Whether these conditions can be replicated elsewhere remains to be seen.

## **7. Concluding comments**

As it now turns out, all the above cases provide supportive evidence to the Transactions Costs thesis stated above, that without appropriate safeguards, LLU will be basically non-viable as business model. The excessive transaction costs caused by incomplete contracting among opportunistic, asymmetrically dependent, and competing players cannot be resolved by standard LLU-regulation alone. As documented both in the EU and the US cases, regulatory enforced LLU have so far been highly insufficient as safeguards against the ensuing regulatory and transaction hazards. Whereas the European case illustrates the existence of prohibitive transaction costs in the pre-entry phase, the American case illustrates significant transaction hazards in the post-entry phase, caused by the numerous conflicts and excessive appeal rights contained in the US two-track, multi-level regulatory-judicial regime. Recently, the introduction of UNE-P in the US coupled with the collapse of the long distance market and the consequent shift in strategy by the large IXC's, contributed to the growth in unbundling, particularly in those states that have implemented low UNE-P charges.

The Norwegian case is more difficult to generalize. The incentives of the publicly owned company to follow governmental instructions, its peculiar prior investment in ISDN and its consequent lack of attention to the DSL market, and the niche strategy played by the entrant, all contributed to the entrant's success in capturing an unusually large market share.

Certainly, other public operators will not follow the government line, nor overinvest in ISDN, nor postpone investments for fear of cannibalization in the face of competition. Thus, the Norwegian case may remain as one of strategic failure and regulatory compliance by the public corporation Telenor more than the success of a regulatory or entry approach as such.

In sum, local loop unbundling remains as difficult to implement today as it was before. Regulatory solutions are not going to solve entry problems for small new entrants. New entrants with success probability will end up being other large scale operators, for whom unbundling probably makes little sense. Line sharing has failed in most jurisdictions, and probably will do so elsewhere. It's time to move forward and let competitors compete.