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## IN RESPONSE...

July 2006

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### A RESPONSE TO DR. ROYCROFT (REDUX)

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#### I. Introduction

In this IN RESPONSE, we reply to further comments by Dr. Trevor Roycroft<sup>1</sup> on our PHOENIX CENTER POLICY PAPER NO. 24, *Network Neutrality and Industry Structure*.<sup>2</sup> In our reply to his first set of comments,<sup>3</sup> we clearly showed that all of Dr. Roycroft's criticisms were either incorrect or irrelevant. In fact, it was plain in our reply that his comments were difficult to reconcile with a basic reading of POLICY PAPER NO. 24 and with the established literature in general.<sup>4</sup> Notwithstanding, despite showing conclusively in our first IN RESPONSE that Dr. Roycroft clearly did not carefully read, much less understand, our original paper, Dr. Roycroft simply chose to ignore our first IN RESPONSE and to issue both a subsequent paper critiquing our work<sup>5</sup> and a

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<sup>1</sup> Dr. Roycroft's rejoinder to our first IN RESPONSE is available on the Phoenix Center's web page at: [http://www.phoenix-center.org/Reply\\_to\\_Phoenix\\_Final.pdf](http://www.phoenix-center.org/Reply_to_Phoenix_Final.pdf). The Phoenix Center has a long-standing policy to post substantive critiques of our work in an effort to ensure the accuracy and legitimacy of all analysis performed and released by the Phoenix Center. In some cases, comments on our work provide direction for future research. At the Phoenix Center, we appreciate criticism and comment, since such review can be used to either affirm or improve our analysis, thereby making our work more useful for policy decisions.

<sup>2</sup> G. Ford, T. Koutsky and L. Spiwak, *Network Neutrality and Industry Structure*, PHOENIX CENTER POLICY PAPER NO. 24 (April 2006) (available at: <http://www.phoenix-center.org/pcpp/PCPP24Final.pdf>).

<sup>3</sup> Dr. Roycroft's first critique to POLICY PAPER NO. 24 may be downloaded from the Phoenix Center's web page at: <http://www.phoenix-center.org/RoycroftRespPCPP24.pdf>.

<sup>4</sup> *Network Neutrality and Scale Economies: A Response to Dr. Roycroft* (May 2006) (available at <http://www.phoenix-center.org/RoycroftResponseFinal.pdf>).

<sup>5</sup> Trevor R. Roycroft, *Economic Analysis And Network Neutrality: Separating Empirical Facts From Theoretical Fiction* – Issue Brief Prepared for Consumer Federation of America, Consumers Union and Free Press (June 2006) (available at: [http://www.freepress.net/docs/roycroft\\_study.pdf](http://www.freepress.net/docs/roycroft_study.pdf)).

**PHOENIX CENTER FOR ADVANCED LEGAL & ECONOMIC PUBLIC POLICY STUDIES**

5335 Wisconsin Avenue, NW, Suite 440

Washington, D.C. 20015

Tel: (+1) (202) 274-0235 Fax: (+1) (202) 244-8257/9342 e-Fax: (+1) (202) 318-4909

[www.phoenix-center.org](http://www.phoenix-center.org)

subsequent comment on our initial IN RESPONSE where he not only repeats the analytical errors of his first flawed critique but adds to them. As we describe briefly in this IN RESPONSE, Roycroft's additional criticisms of POLICY PAPER NO. 24 are as irrelevant and inaccurate as his initial commentary. Roycroft's sophomoric comments continue to exhibit a fundamental failure to carefully read and fully comprehend the analysis contained in POLICY PAPER NO. 24, and perhaps a general lack of familiarity with the basic principles and tools of economic analysis. Equally as important, the fact that Dr. Roycroft deliberately continues to ignore these obvious points in his subsequent papers – despite the fact that he was made aware of the patent errors in his original critique – is disingenuous.

To remind the reader, the theme of POLICY PAPER NO. 24 was simple and logical, and can be summarized as an analysis which:

... shows that policymakers should avoid Network Neutrality mandates that have the intent or effect of “commoditizing” broadband access services since such a policy approach is likely to deter facilities-based competition, reduce the expansion and deployment of advanced communications networks, and increase prices. Given the economic characteristics of local communications networks, policies that promote commoditization of broadband access could lead to the monopoly provision of advanced broadband services in many markets. This outcome would harm consumers substantially (at 1).

Our findings were based on (what we thought was) a well-understood principle of economics.<sup>6</sup> Specifically, the basic underlying theory of the paper is that *as the products of firms become more differentiated, price competition weakens thereby increasing profits, and this increase in profits allows, under certain conditions, additional entry.*<sup>7</sup> This simple theme is fairly standard industrial economics and holds under a wide range of assumptions including the theoretical

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<sup>6</sup> J. Tirole, *THE THEORY OF INDUSTRIAL ORGANIZATION* (1995) (“price competition is softened when the firms face sharply rising marginal costs (capacity constraints, in an extreme case), when they compete repeatedly, or where their products are differentiated (at 223-4); “Moving toward the other firm increases the intensity of price competition (at 329).”; S. Martin, *ADVANCED INDUSTRIAL ECONOMICS* (1993) (“We see that [with homogeneous products] price equals marginal costs (the competitive result), while [if products are completely differentiated] price is set at the monopoly level (at 39)”; and even M. E. Porter, *COMPETITIVE STRATEGY* (1980) (“Where the product or service is perceived as a commodity or near commodity, choice by the buyer is largely based on price and service, and pressures for intense price and service competition results. These forms of competition are particularly volatile []. Product differentiation, on the other hand, creates layers of insulation against competitive warfare because buyers have preferences and loyalties to particular sellers (at 19).”

<sup>7</sup> The analysis was unique in that we considered only the effect of differentiation on price competition and ignored the value of variety. A similar theoretical approach to product differentiation and competition is presented in S. Martin (1993), *supra* n. 6 at 38-40.

specification of competition, the nature of demand, and/or the cost structure.<sup>8</sup> Our economic model shows that this additional entry increases consumer welfare, even if consumers do not value differentiation *per se* (i.e., the benefits are purely from price reductions). The theoretical contribution of our paper related primarily to the specification of a demand system where product differentiation could impact consumer welfare even if consumers did not value the differentiation itself. This approach to the problem was a fresh analysis of the well-known relationship between differentiation and profits.

The focus of our analysis (as always) was how policies (in that case Network Neutrality proposals) affect consumer welfare. In the PAPER, we repeatedly noted that we took no position on the desire or need for Network Neutrality legislation. Rather, the purpose of the paper was to illustrate how particular manifestations of Network Neutrality rules can adversely affect market structure and, consequently, harm consumers. We encouraged policymakers in POLICY PAPER NO. 24 to “be aware of the need to balance concerns about discrimination with the danger that commoditizing the market for broadband Internet access services may lead to the monopoly provision of broadband Internet access service in many markets (at 4).” The need to balance the conflicting effects of Network Neutrality rules is undeniably pro-consumer.

In the sections that follow, we will address the additional comments of Dr. Roycroft on POLICY PAPER NO. 24, somewhat in the order they appear in his document.

## II. Sunk Costs and Scale Economies

Despite the apparent and fundamental role played by sunk costs and scale economies in our analysis (see our first IN RESPONSE to Roycroft), in his latest round of comments Roycroft continues to argue that our paper failed to consider sunk costs and economies of scale. Roycroft states:

Phoenix’s Cournot approach to modeling entry in last-mile markets in POLICY PAPER NO. 24 does not reflect the reality [that entry into the local exchange market requires large fixed and sunk costs, making entry risky and necessitating scale economies]. Last-mile telecommunications competition faces an uphill battle, and incumbents hold a decided market advantage (at 7).”

As we explained in our initial IN RESPONSE, Dr. Roycroft’s allegation is simply ridiculous because it is impossible to reconcile such a critique with the plain text of POLICY PAPER NO. 24. In describing our findings, we note:

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<sup>8</sup> *Id.*

Economic theory suggests that product differentiation is an important component of competition, particularly in industries with large fixed and sunk costs (at 2).

Also, we observe,

... policymakers should always consider how various policy proposals influence the underlying economics of entry into communications markets so that the existing entry-limiting economic conditions are not intensified by regulatory intervention. As we show in this POLICY PAPER, Network Neutrality rules that encourage commoditization of broadband service *exacerbate* this tendency toward concentration in an industry that already characterized by an inherently high equilibrium industry concentration level (at 3-4).

As we have shown clearly and repeatedly in our work, the communications industry is characterized by an inherently high equilibrium industry concentration level because of fixed and sunk costs (and Roycroft, in his comments, quotes us repeatedly on this point).<sup>9</sup> We also observe in the paper:

... policymakers need to be aware that Network Neutrality rules themselves can have the effect of making competition and entry in an already concentrated market *even less likely* in the future (at 20).

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<sup>9</sup> Indeed, many of our papers were heavily influenced by the pioneering work of John Sutton (*see* John Sutton, *SUNK COSTS AND MARKET STRUCTURE* (Cambridge, MA: The MIT Press, 1996)) and rely on Sutton's general conceptual framework of understanding the relationship of sunk costs to industry equilibrium for their theoretical orientation. *See, e.g.*, J. Duvall and G. Ford, *Changing Industry Structure: The Economics of Entry and Price Competition*, PHOENIX CENTER POLICY PAPER NO. 10 (April 2001), reprinted in 7 *TELECOMMUNICATIONS & SPACE JOURNAL* 11 (2001); T. R. Beard, G. Ford and L. Spiwak, *Why ADco? Why Now? An Economic Exploration into the Future Industry Structure for the "Last Mile" in Local Telecommunications Markets*, PHOENIX CENTER POLICY PAPER NO. 12 (November 2001); reprinted in 54 *FED. COM. L. J.* 421 (May 2002); G. Ford, T. Koutsky and L. Spiwak, *Competition After Unbundling: Entry, Industry Structure and Convergence*, PHOENIX CENTER POLICY PAPER NO. 21 (July 2005). Moreover, we have also discussed the presence of high fixed and sunk costs as entry barriers for years. *See e.g.*, G. Ford, T. Koutsky and L. Spiwak, *The Consumer Welfare Cost of Cable "Build-out" Rules*, PHOENIX CENTER POLICY PAPER NO. 22 (July 2005), reprinted as *The Economics of Build-Out Rules in Cable Television*, 28 *HASTINGS COMMUNICATIONS AND ENTERTAINMENT LAW JOURNAL* 207 (2006); T. Hazlett & G. Ford, *The Fallacy of Regulatory Symmetry: An Economic Analysis of the 'Level Playing Field' in Cable TV Franchising Statutes*, 3 *BUSINESS AND POLITICS* 21 (2001); J. Olson and L. Spiwak, *Can Short-Term Limits on Strategic Vertical Restraints Improve Long-Term Cable Industry Market Performance?* 13 *CARDOZO ARTS & ENT. L.J.* 283 (1995). Given such a long and consistent record of recognizing the presence of high fixed and sunk costs in the telecommunications industry, Dr. Roycroft's claim's that we ignore the presence of sunk costs is laughable.

All three of these statements are found in either the Introduction or Conclusion, so even a marginally interested reader would likely read them. Further, the term “sunk costs” appears over 20 times in POLICY PAPER NO. 24. Why Dr. Roycroft continues to bull-headily ignore the obvious and vital role played by sunk costs and scale economies in our paper (and in our research over the years) is a total mystery.

### III. The Cournot Model

In his latest commentary, Roycroft spends a great deal of time complaining about our (alleged) exclusive use of the Cournot model of competition in our theoretical analysis. Yet, one needs to look no further than the Table of Contents to our POLICY PAPER to see that our theoretical analysis considers not one but *three* alternative models of competition: (1) monopoly (the lack of competition); (2) Cournot competition; and (3) Bertrand competition. Or, had he read the text of the POLICY PAPER, he may have stumbled upon the sentence reading, “[i]n our model, price competition can be either Cournot competition in quantities or Bertrand competition in prices (at 10).” Again, Dr. Roycroft appears not to have studied our analysis sufficiently to provide meaningful commentary on it.

As for the validity of his that “Cournot modeling may make the most sense if marginal costs are sharply rising,” which he supports with a quotation from Jean Tirole’s seminal text “Theory of Industrial Organization,” Roycroft has confused general modeling technique with Tirole’s reconciliation of Bertrand and Cournot outcomes when capacity-constrained Bertrand competition occurs (rendering the Cournot outcome).<sup>10</sup> Looking back to Tirole’s treatment of “Traditional Cournot Competition,” Tirole assumes constant cost.<sup>11</sup> Further, those with even a casual familiarity with the economic literature know that Cournot competition with constant costs is a common modeling approach.<sup>12</sup> Or, as the notable scholar of oligopoly theory James Friedman observed, “[i]f one must choose between the models of Cournot and Bertrand as providing the best simple vehicle for exhibiting the nature of oligopoly, the Cournot model is definitely superior ....”<sup>13</sup> But even more important, whether or not costs are rising, falling, or

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<sup>10</sup> The seminal article illustrating the point is D. M. Kreps and J. A. Scheinkman, *Quantity Precommitment and Bertrand Competition Yield Cournot Outcomes*, 14 BELL JOURNAL OF ECONOMICS 326-37 (1983).

<sup>11</sup> Tirole (1995), *supra* n. 6 at 220.

<sup>12</sup> Consider these recently published papers in the AMERICAN ECONOMIC REVIEW (the most prestigious journal of the economics profession): C. E. Hall and R. E. Hall, *Toward a Quantification of the Effects of Microsoft’s Conduct*, 90 AMERICAN ECONOMIC REVIEW 188-191 (2000); S. W. Salant and Greg Shaffer, *Unequal Treatment of Identical Agents in Cournot Equilibrium*, 89 AMERICAN ECONOMIC REVIEW 585-604 (1999); and R. Schmalensee, *Sunk Costs and Antitrust Barriers to Entry*, 94 AMERICAN ECONOMIC REVIEW 472-475 (2004).

<sup>13</sup> J. Friedman, *Oligopoly Theory*, in K. J. Arrow and M. D. Intriligator (eds), HANDBOOK OF MATHEMATICAL ECONOMICS, VOL. II (1982): 491-534 at 505.

constant, the conclusions of our POLICY PAPER are unchanged, and that fact should be apparent to the trained eye of an economist.<sup>14</sup> So, not only is Dr. Roycroft wrong on all counts, but his entire discussion is irrelevant to the conclusions of our paper.

#### IV. Product Differentiation

Roycroft contends that our model requires that product differentiation be entirely eliminated. In the model in our paper, goods are commodities when the “theta” term equals 1.00 (that is,  $\theta = 1$ ). Roycroft’s comment on differentiation is incorrect and apparently the consequence of a failure to comprehend mathematical economic models. While we do assume  $\theta = 1$  in our *Proposition* and *Proof* (at 18), this assumption is merely a modeling convenience. We could just have easily assumed that Network Neutrality rendered  $\theta = 0.9$  (or any other value less than 1), and then said that absent Network Neutrality  $\theta < 0.9$  (or whatever value we assumed for  $\theta$ ). Since the model is continuous in  $\theta$ , the results holds irrespective of the initial value of  $\theta$  chosen for comparison. Again, Roycroft’s comments on our paper reveal his failure to fully comprehend our analysis.

#### V. “Large” versus “Not Too Large”

In his first round of comments, Roycroft incorrectly asserted that we assumed in our model that sunk costs were small. In fact, our paper states that sunk costs are “not too large.” Obviously, there’s a difference. “Large” is an absolute concept, whereas “not too large” is a relative concept.

In his second set of comments, Roycroft again exhibits his inability to grasp the simple difference between the concepts of absolute and relative sizes. In our first IN RESPONSE, Roycroft claims that we provided an “entertaining exercise in illogic to support the proposition that ‘low level’ and ‘not too large’ are entirely different concepts (at 13).” Yet, they are entirely different concepts, and any respectable economists would know why.

The issue of sunk costs being “not too large” is part of the discussion of Equation (29). Equation (29) essentially states that a firm will enter (and increase consumer welfare) if the firm’s gross profits exceed the sunk costs of entry ( $E$  in the equation). By “not too large,” we

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<sup>14</sup> While the mathematical analysis would be more complex, there is no reason to complicate an economic model with assumptions that do not meaningfully alter the conclusions. The only potential change to the conclusion is that with rapidly declining marginal cost, it may be best for the government to prohibit competition altogether and regulate a statutory monopoly. We do not believe government-sanctioned and protected monopoly is a legitimate approach to broadband policy. Even so, our mathematical model remains valid, but satisfying the condition for welfare improving entry would be very difficult.



mean that this condition is satisfied only if  $E$  is less than gross profits, not that  $E$  is small or large in terms of its level. Thus, being “not too large” is a relative matter, not an absolute one.

For example, say that gross profits are \$100 billion dollars. Then,  $E$  would need to be \$99.99 billion to be “not too large.” Of course, \$99.99 billion dollars is not a small level of sunk costs by any standard, but it is “not too large” in the context of our model. Or, in contrast, if gross profits are only \$1, then  $E$  is “too large” if it is \$1.01, but obviously \$1.01 is not a large number in absolute terms, but it would be “too large” in our model. Again, Roycroft fails to understand our economic model and, it appears, economic modeling and logic more generally.

## VI. Additional Irrelevancies

Roycroft’s careless commentary is not restricted to his limited understanding of POLICY PAPER NO. 24. For example, Roycroft criticizes our model because we fail to address the issue of whether incumbents will accommodate or deter the entry made possible by product differentiation (Roycroft 2, at 4). In his comments, he states:

Phoenix’s model’s prediction is that a monopolist’s response to entry by a firm which offers a slightly differentiated product is to accommodate and share the market. Clearly this is not a reasonable expectation when incumbents are dominant firms (at 4).

Roycroft is precisely wrong on this point. Had Dr. Roycroft made even a cursory review of the literature on entry accommodation and deterrence, he would have observed that product differentiation is a form of “puppy dog” behavior, implying that an incumbent (even a monopolist) is more likely to accommodate entry if there is product differentiation.<sup>15</sup> So, unlike Roycroft’s claim, accommodation *is* a reasonable expectation when incumbents are dominant firms and there is differentiation. Thus, Roycroft has pointed out an additional harm of Network Neutrality legislation that leads to commoditization – such rules will encourage incumbent firms to fight entry more aggressively.

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<sup>15</sup> D. Fudenberg and J. Tirole, *The Fat-Cat Effect, The Puppy-Dog Ploy, and the Lean and Hungry Look*, 74 AMERICAN ECONOMIC REVIEW 361-366 (1984); Tirole (1995), *supra* n. 6 (“Product differentiation is another instance of “puppy dog” behavior (at 329)”). The prospects for sabotage are also diminished when there is product differentiation. See N. Economides, *The Incentive for Non-Price Discrimination by an Input Monopolist*, 16 INTERNATIONAL JOURNAL OF INDUSTRIAL ORGANIZATION 271-284(1998); D. Mandy, *Killing The Goose That May Have Laid The Golden Egg: Only The Data Know Whether Sabotage Pays*, 17 JOURNAL OF REGULATORY ECONOMICS 157-172 (2000); D. Mandy and D. E. M. Sappington, *Incentives for Sabotage in Vertically Related Industries*, JOURNAL OF REGULATORY ECONOMICS (Forthcoming 2006) (“the integrated producer will refrain from sabotage when products are sufficiently differentiated and undertake the foreclosure level of sabotage when products are sufficiently homogeneous in the linear setting with Cournot competition”).

## VII. Comments on PHOENIX CENTER POLICY PAPER NO. 12

A number of Roycroft's new comments are based on a comparison of the analysis in POLICY PAPER NO. 24 and the earlier paper PHOENIX CENTER POLICY PAPER NO. 12, *Why ADCo? Why Now? An Economic Exploration into the Future Industry Structure for the "Last Mile" in Local Telecommunications Markets*.<sup>16</sup> As is the case with all our papers, both papers are available (at no charge) on the Phoenix Center website ([www.phoenix-center.org](http://www.phoenix-center.org)). Our series of POLICY PAPERS and POLICY BULLETINS reveals our consistent and analytically rigorous approach to public policy issues.

In the next two sections, we will describe Roycroft's gross mis-interpretation and/or misunderstanding of our analysis in POLICY PAPER NO. 12.

### A. Incentives for Sabotage

In relation of a firm's incentive to sabotage rivals, Dr. Roycroft completely misunderstands our analysis in POLICY PAPER NO. 12. In fact, his failure to grasp the essence of the argument leads him to argue *against* the need for network neutrality.

In POLICY PAPER NO. 12, we presented an analysis of the incentives of a dominant firm (essentially a monopolist) to sell unbundled elements to retail competitors. As part of the analysis, we presented a theoretical argument explaining the incentives of this dominant firm to sabotage downstream retailers through non-price discriminatory actions. The relevance of that analysis to the Network Neutrality debate is abundantly clear to us (and has been), even though Dr. Roycroft contends that we have failed to "see the parallel" between that research and analysis in POLICY PAPER NO. 24. Strangely, the relevance of that work is entirely at odds with the positions taken by Dr. Roycroft on Network Neutrality.

Let us explain. Roycroft quotes our POLICY PAPER NO. 12 where it states, "to the extent that the incumbent dominant firm is able to impose costs on rivals, its incentives are to do so (at 8)." However, Dr. Roycroft fails to mention that *the incentive to sabotage rivals is solely the consequence of the imposition of price regulation on the dominant firm. In the absence of price regulation, there is no incentive to sabotage rivals* (and this result is general in models of sabotage).<sup>17</sup> Thus, network neutrality advocates calling for the regulation of the prices of broadband service providers (either the prices firms can charge end-users or content providers) are, in effect, calling for their

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<sup>16</sup> *Supra* n. 9.

<sup>17</sup> The definition of the term "sabotage" originates T. Randolph Beard, David Kaserman, and John Mayo, *Regulation, Vertical Integration, and Sabotage*, 49 JOURNAL OF INDUSTRIAL ECONOMICS 319-33 (2001). See also Economides (1998), Mandy (2000), and Mandy and Sappington (2006), *supra* n. 15.



own sabotage. As anyone familiar with the economic literature on sabotage knows: *regulation is not the cure for sabotage; regulation is the cause of sabotage*. Clearly, Dr. Roycroft is not familiar with the literature on this point.

B. *Modeling Choice in Policy Paper No. 12*

Dr. Roycroft claims that we should have applied the “dominant firm, competitive fringe” model from POLICY PAPER NO. 12 to the issue considered in POLICY PAPER NO. 24. Again, Dr. Roycroft has a problem reading the text of our papers. The economic model of competition in POLICY PAPER NO. 12 is not the dominant firm/competitive fringe model, which should be obvious since the phrase “competitive fringe” never appears in the paper and the particular mathematical calculations of that model are entirely absent from the analysis. As for POLICY PAPER NO. 24, dominance is inherent to the model, since we consider only concentrated market structures with significant scale economies. Thus, Dr. Roycroft’s comment is again incorrect and irrelevant.

### VIII. Conclusion

The Phoenix Center is strong advocate of, and significant contributor to, the meaningful debate over the economic and legal principles relevant to the reform of communications legislation and regulation. We encourage commentary on our analysis, critical or supportive, and have a long-standing policy of publishing on our website all thoughtful analysis. Dr. Roycroft, however, has not once *but twice* failed this basic test of basic professionalism and analytical rigor. As such, while we will certainly continue to offer to publish Dr. Roycroft’s comments in the future, we will do so only if he is able to construct a meaningful and relevant set of comments that exhibit an understanding of our work and the fundamental economic principles therein.

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5335 Wisconsin Avenue, NW, Suite 440

Washington, D.C. 20015

Tel: (+1) (202) 274-0235 Fax: (+1) (202) 244-8257//9342 e-Fax: (+1) (202) 318-4909

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