

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

DELL INC.  
Petitioner

v.

ALACRITECH, INC.  
Patent Owner

---

Case IPR. No. **2018-00375**  
U.S. Patent No. 7,673,072  
Title: FAST-PATH APPARATUS FOR RECEIVING DATA CORRESPONDING  
A TCP CONNECTION

---

**Declaration of Robert Horst, Ph.D. in Support of  
Petition for *Inter Partes* Review  
of U.S. Patent No. 7,673,072**

**TABLE OF CONTENTS**

	<b>Page</b>
I. INTRODUCTION AND QUALIFICATIONS.....	1
II. MATERIALS RELIED ON IN FORMING MY OPINION .....	4
III. UNDERSTANDING OF THE GOVERNING LAW .....	4
A. Invalidity by Anticipation .....	4
B. Invalidity by Obviousness .....	5
IV. LEVEL OF ORDINARY SKILL IN THE ART .....	6
V. STATE OF THE ART AND OVERVIEW OF TECHNOLOGY AT ISSUE.....	8
A. Layered Network Protocols.....	8
1. OSI Layers .....	8
2. TCP/IP Layers.....	8
B. TCP/IP .....	10
1. Encapsulation .....	11
2. Ethernet Header.....	12
3. IP Header.....	13
4. TCP header.....	14
5. RFC 793 – TCP Specification.....	15
6. Prepending Headers .....	18
7. TCP Control Block (TCB).....	20
8. Segmentation.....	23
9. Advertising a Receive Window .....	24
C. Protocol Offload.....	25
1. RFC 647 – Front-Ending .....	25
2. RFC 929 – Outboard Processing .....	26
3. Mediation Levels.....	28
D. Offloaded Protocols.....	30

1.	OSI Protocol Offload .....	31
2.	TCP/IP Protocol Offload.....	31
3.	VMTP and XTP Protocol Offload .....	31
4.	Multi-Protocol Offload .....	31
E.	Portions of the Protocol Offloaded .....	32
1.	Checksum Offload .....	32
2.	Full Offload.....	33
3.	Multi-Level Offload.....	34
4.	Header Prediction.....	34
F.	Offload Implementation .....	36
1.	Multiprocessor Offload.....	37
2.	Offload Adapters based on Microprocessors.....	39
3.	Offload Adapters based on Custom Processors or Custom Logic .....	40
G.	Protocol Offload Summary .....	43
H.	Additional Background Technology .....	44
1.	DMA .....	44
2.	Virtual and Physical Memory Addresses.....	47
VI.	OVERVIEW OF 072 PATENT .....	48
VII.	072 PATENT PROSECUTION HISTORY .....	53
VIII.	CLAIM CONSTRUCTIONS .....	54
A.	Legal Standard.....	54
B.	“context”.....	54
C.	“prepend”.....	55
IX.	THE PRIOR ART.....	55
A.	Tanenbaum96: A. Tanenbaum, Computer Networks, 3rd ed. (1996) .....	55
B.	U.S. Patent No. 5,768,618 (“Erickson”) .....	62
X.	Obviousness Combinations – Motivations To Combine .....	74

A. Erickson in Combination with Tanenbaum96 .....74  
XI. GROUNDS OF INVALIDITY .....81

I, Robert Horst, hereby declare as follows:

**I. INTRODUCTION AND QUALIFICATIONS**

1. My name is Robert Horst. I have been retained on behalf of Petitioner Dell Inc. (“Dell”) to provide this Declaration concerning technical subject matter relevant to the petition for *inter partes* review (“Petition”) concerning U.S. Patent No. 7,673,072 (Ex.1001, the “072 Patent”). I previously offered substantially identical declarations in connection with Case Nos. IPR2017-01406 (for Intel Corporation), IPR2017-01707 (for Cavium, Inc.), and IPR2018-00329 (for Wistron Corporation). I reserve the right to supplement this Declaration in response to additional evidence that may come to light.

2. I am over 18 years of age. I have personal knowledge of the facts stated in this Declaration and could testify competently to them if asked to do so.

3. My compensation is not based on the resolution of this matter. My findings are based on my education, experience, and background in the fields discussed below.

4. I am an independent consultant with more than 30 years of expertise in the design and architecture of computer systems. My current curriculum vitae is submitted as Exhibit 1004 and some highlights follow.

5. Currently, I am an independent consultant at HT Consulting where my work includes consulting on technology and intellectual property. I have testified

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.