

<b>PATENT ASSIGNMENT COVER SHEET</b>
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Electronic Version v1.1  
 Stylesheet Version v1.2

EPAS ID: PAT7213037

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
THOMAS C. WOLDAHL	11/07/2019
ERIK V. HELFRICH	11/07/2019
MICHAEL J. DURKIN	11/07/2019
LARRY J. NORTH	11/08/2019
ABID KHAN	11/07/2019
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	LEVEL 3 COMMUNICATIONS, LLC
<b>Street Address:</b>	1025 ELDORADO BLVD.
<b>City:</b>	BROOMFIELD
<b>State/Country:</b>	COLORADO
<b>Postal Code:</b>	80021
<b>PROPERTY NUMBERS Total: 1</b>	
<b>Property Type</b>	<b>Number</b>
<b>Application Number:</b>	17687318
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>	
<b>Email:</b>	patent.docketing@lumen.com
<b>Correspondent Name:</b>	LEVEL 3 COMMUNICATIONS, LLC
<b>Address Line 1:</b>	1025 ELDORADO BLVD.
<b>Address Line 4:</b>	BROOMFIELD, COLORADO 80021
<b>ATTORNEY DOCKET NUMBER:</b>	0663-US-D1-C1
<b>NAME OF SUBMITTER:</b>	THOMAS A. FROATS
<b>SIGNATURE:</b>	/Thomas A. Froats/
<b>DATE SIGNED:</b>	03/08/2022
<b>Total Attachments: 7</b>	
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## ASSIGNMENT

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### PARTIES TO THE ASSIGNMENT:

#### Assignors/Inventors:

Name of Assignor: **Thomas C. Woldahl**  
City and State of Residence: **Phoenix, Arizona, USA**

Name of Assignor: **Erik V. Helfrich**  
City and State of Residence: **Queen Creek, Arizona, USA**

Name of Assignor: **Michael J. Durkin**  
City and State of Residence: **Littleton, Colorado, USA**

Name of Assignor: **Larry J. North**  
City and State of Residence: **Littleton, Colorado, USA**

Name of Assignor: **Abid Khan**  
City and State of Residence: **Castle Rock, Colorado, USA**

#### Assignee:

**Level 3 Communications, LLC**  
**1025 Eldorado Boulevard**  
**Broomfield, Colorado 80021**

### PATENT APPLICATION SUBJECT TO THE ASSIGNMENT (the "Application"):

U.S. Nonprovisional Application No.: **16/680,275**  
Filing Date: **November 11, 2019**  
Title: **SYSTEMS, METHODS, AND STORAGE MEDIA FOR TESTING  
LOCAL LOOPS OF TELECOMMUNICATIONS NETWORKS**  
Attorney Docket No. **0663-US-U1**

WHEREAS, Assignors have invented certain new and useful inventions (the "Invention") for which the Application have been prepared for filing with the United States Patent and Trademark Office.

NOW THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is acknowledged, Assignors have agreed to assign and transfer and do hereby assign and transfer unto Assignee, its successors and assigns, the entire right, title, and interest in and to the Invention and the Application, including any provisional or non-provisional application to which the Application claim priority, including but not limited to U.S. provisional patent application no. 62/768,589, in and to any United States of America and foreign applications that claim priority to the Application, any divisional or continuation (in whole or in part) of the

Application, and in and to any and all improvements in the Invention made by Assignors (provided any such improvement is made during, or within one year after the termination of the employment of Assignors by Assignee), and in and to any and all Letters Patent, reexaminations, reissues, or extensions thereof, of the United States of America and countries foreign thereto including the right to apply for Letters Patent, Utility Models, or Inventors' Certificates in the United States of America and all foreign countries in its own name and any priority rights for such United States of America and foreign applications to which such applications or Assignors are entitled under international conventions, treaties, or otherwise which have been or may be granted thereon or on any divisional, continuation (in whole or in part), renewal, reexamination, reissue, or other or further application based in whole or in part upon said invention or improvements thereon, and any and all rights to collect past damages for infringement of any and all Letters Patent of the United States and countries and regions foreign thereto which may be published, to be held and enjoyed as fully and exclusively as they would have been by the Assignors had this assignment and transfer not been made;

Assignors further agree for Assignors and for Assignors' heirs, executors, and administrators, to execute and deliver without further consideration any further applications, assignments, and documents, and to perform such other acts as Assignors lawfully may, that may be deemed necessary by said Assignee, its successors, assigns, and nominees, fully to secure its right, title, and interest as aforesaid to obtain to maintain Letters Patent, Utility Models, or Inventors' Certificates in any and all countries;

Assignors hereby authorize Assignee, its successors and assigns, or anyone it may properly designate, to insert in this instrument the title, application number and filing date of the Application once known;

Assignors hereby acknowledge that Assignee's internal and external counsel have represented only Assignee and will continue to represent only Assignee with respect to the Invention;

Assignors hereby acknowledge an obligation of assignment and transfer of the Invention and Application to Assignee at the time the Invention was made; and

Assignors hereby authorize and request the Commissioner of Patents to issue any and all Letters Patent which may be granted upon any of the applications, including the Application, to Assignee, as the assignee of the entire right, title, and interest therein.

Assignors and Assignee hereby agree that this assignment is governed by the laws of the state of Colorado of the United States of America and subject to the non-exclusive jurisdiction of the courts of the state of Colorado of the United States of America.

IN WITNESS WHEREOF, Assignors hereunto have executed this Assignment upon the date indicated below.

By: Thomas C Woldahl  
Thomas C. Woldahl

Dated: 11/7/2019

By: \_\_\_\_\_  
Erik V. Helfrich

Dated: \_\_\_\_\_

By: \_\_\_\_\_  
Michael J. Durkin

Dated: \_\_\_\_\_

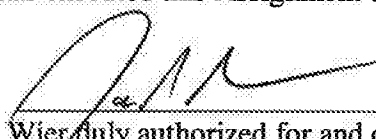
By: \_\_\_\_\_  
Larry J. North

Dated: \_\_\_\_\_

By: \_\_\_\_\_  
Abid Khan

Dated: \_\_\_\_\_

IN WITNESS WHEREOF, Assignee hereunto has executed this Assignment upon the date indicated below.

By:   
David Wier duly authorized for and on behalf of  
Level 3 Communications, LLC

Dated: 11/14/2019

IN WITNESS WHEREOF, Assignors hereunto have executed this Assignment upon the date indicated below.

By: \_\_\_\_\_  
Thomas C. Woldahl

Dated: \_\_\_\_\_

By: \_\_\_\_\_  
Erik V. Helfrich  
Erik V. Helfrich

Dated: 11/7/2019

By: \_\_\_\_\_  
Michael J. Durkin

Dated: \_\_\_\_\_

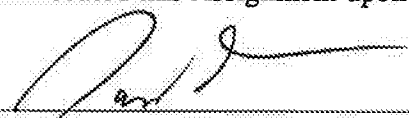
By: \_\_\_\_\_  
Larry J. North

Dated: \_\_\_\_\_

By: \_\_\_\_\_  
Abid Khan

Dated: \_\_\_\_\_

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Thomas C. Woldahl

Dated: \_\_\_\_\_

By: \_\_\_\_\_  
Erik V. Helfrich

Dated: \_\_\_\_\_

By: Michael J. Durkin  
Michael J. Durkin

Dated: 11/7/2019

By: \_\_\_\_\_  
Larry J. North

Dated: \_\_\_\_\_

By: \_\_\_\_\_  
Abid Khan

Dated: \_\_\_\_\_

IN WITNESS WHEREOF, Assignee hereunto has executed this Assignment upon the date indicated below.

By: David Wier  
David Wier duly authorized for and on behalf of  
Level 3 Communications, LLC

Dated: 11/14/2019

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By: \_\_\_\_\_  
Thomas C. Woldahl

Dated: \_\_\_\_\_

By: \_\_\_\_\_  
Erik V. Helfrich

Dated: \_\_\_\_\_

By: \_\_\_\_\_  
Michael J. Durkin

Dated: \_\_\_\_\_

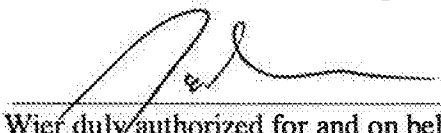
By: \_\_\_\_\_  
Larry J. North  
Larry J. North

Dated: \_\_\_\_\_ 11/8/19

By: \_\_\_\_\_  
Abid Khan

Dated: \_\_\_\_\_

IN WITNESS WHEREOF, Assignee hereunto has executed this Assignment upon the date indicated below.

By: \_\_\_\_\_  
  
David Wier duly authorized for and on behalf of  
Level 3 Communications, LLC

Dated: \_\_\_\_\_ 11/14/2019



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By: \_\_\_\_\_  
Thomas C. Woldahl

Dated: \_\_\_\_\_

By: \_\_\_\_\_  
Erik V. Helfrich

Dated: \_\_\_\_\_

By: \_\_\_\_\_  
Michael J. Durkin

Dated: \_\_\_\_\_

By: \_\_\_\_\_  
Larry J. North

Dated: \_\_\_\_\_

By: A b i d K h a n  
Abid Khan

Dated: 11/7/2019

IN WITNESS WHEREOF, Assignee hereunto has executed this Assignment upon the date indicated below.

By: \_\_\_\_\_  
David Wier duly authorized for and on behalf of  
Level 3 Communications, LLC

Dated: 11/17/2019