Name and address of submitting body:

NIELIT Chandigarh,

Plot No. C-134, Phase VIII, Industrial Area, Sector 72, Mohali. 160071.

Name and contact details of individual dealing with the submission

Name:	RAMINDER SINGH
Position in the organization	Deputy Dir. (Technical)
Address if different from above	NA
Tel number(s)	0172-2236470, 9915922152
E-mail address	raminder@nielit.gov.in

List of documents submitted in support of the Qualifications File

1. Detailed Curriculum
2. Industry Validation (Attached at Annexure- I)
3. Placement Records (Attached at Annexure-II)
4. Detailed Curriculum (Attached at Annexure-III)
5. Detailed Industry Validation Documents (Attached at Annexure-IV) as separate pdf formats.

QUALIFICATION FILE SUMMARY

Qualification Title	Networking Specialist (NS)
Qualification Code	**NIELIT/NW/1/38**
Nature and Purpose of Qualification	Technical Diploma
Body/bodies which will award the Qualification	**Examination Cell,** National Institute of Electronics and Information Technology, 6-CGO Complex, Electronics Niketan, Lodhi Road, New Delhi. 110003.
Body/bodies which will award the certificate for the qualification.	National Institute of Electronics and Information Technology 6-CGO Complex, Electronics Niketan, Lodhi Road, New Delhi. 110003.
Body which will accredit providers to offer courses leading to the qualification.	National Institute of Electronics and Information Technology 6-CGO Complex, Electronics Niketan, Lodhi Road, New Delhi. 110003. Presently, Accreditation is not prescribed; affiliation is one of the models.
Body which will carry out Assessment of learners	National Institute of Electronics and Information Technology 6-CGO Complex, Electronics Niketan, Lodhi Road, New Delhi. 110003.
Occupation(s) to which the qualification gives access	Network Administrator, Network Designer, Network Support Provider, Technical Call Executive
Licensing Requirement	NA
Proposed level of the qualification in the NSQF.	Level-6
Anticipated Volume of training /learning required to complete the qualification	780 hours
Entry requirements / recommendations.	Senior Secondary/Undergraduate/Graduate posessing basic knowledge of Computers and Internet Concepts.
Progression from the qualification.	Network Specialist – Next Job Role 1) In Academic After completion of this course, students can go for further courses that provide them certifications in Networking streams like Cisco Certified Network Associate (CCNA), Red Hat Certified Systems Engineer (RHCSE) or Microsoft certified Solutions Engineer (MCSE). Many companies are providing

	initial breakthrough to freshers to join as a trainee / intern .The trainee / interns could use experience gained while working in company as a platform to hone their technical skills and achieve better jobs after doing the requisite certifications as well .
	2) <u>Professional</u> During the initial stages of career candidate might work as work as a trainee / intern whose role would be to identify and troubleshoot basic network related problems. After gaining sufficient experience and upgrading his technical qualifications he could become Network Administrator, Network Designer, Network Support Provider, Technical Call Executive. As a Network Administrator, candidate would be able to Design, Implement and Maintain a corporate Network of Small to Medium Size and as he becomes experienced he could carry out same steps for Medium to Large Networks and could also setup large Scale Data Centres. The candidate could further pursue higher studies it he field of networking and do various postgraduate programmes available in many foreign universities as well.
Planned arrangements for RPL.	• Presently only candidates who undergo training shall be assessed. • It will be incorporated once RPL strategy is finalized
International Comparability Where known: The course has been compared with International courses to establish its validity and compatibility. The details are attached under Section 4 on Page 6	
Date of planned Review of Qualification 2 years from the date of launch	
Formal structure of the qualification	

Title of unit or other component (include any identification code used)	Mandatory/ Optional	Estimated size (learning hours)	Level
Acquiring Basic PC Hardware and Maintenance Skills	Mandatory	60	6

Acquiring Presentation Layer Skills through Word Processing	Mandatory	60	
Develop skills to Design ,Configure , Implement, Maintain and Troubleshoot a network	Mandatory	210	
Develop skills to implement Client Server Network using Windows Server 2012	Mandatory	210	
Develop skills to implement Client Server Network using Linux Operating System	Mandatory	210	
Enhancing Communication Skills	Mandatory	30	

Please attach any document giving further detail about the structure of the qualification – e.g. a Curriculum or Qualification Pack. Detailed Curriculum attached at Annexure III.

SECTION 1
ASSESSMENT

Name of assessment body:
Examination Cell,
National Institute of Electronics and Information Technology
6-CGO Complex, Electronics Niketan,
Lodhi Road, New Delhi. 110003.

Will the assessment body be responsible for RPL assessment?

Give details of how RPL assessment for qualification will be carried out and quality assured.

Presently, only candidates undergoing training shall be assessed. Later on, candidates having experience and knowledge shall be assessed. The information will be provided on finalization of such procedure.

Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of the NSQF:

This course would lay more emphasis on developing the practical skills of the student. His overall knowledge shall be tested based on a comprehensive written assessment, his practical skills shall be equally measured with a detailed practical assessment. The communication skills of the student and his ability to express himself shall be tested in Viva Voce Assessment. Each assessment shall define an OUTCOME and marked separately. Student shall be required to pass in all OUTCOMEs individually and marks shall be allotted for each OUTCOME along with final aggregate marks in course.
Following assessment methodologies may be used:

   A. Written Assessment (Multiple Choice Questions)
   B. Practical Assessment
   C. Viva Voce Assessment

Please attach any documents giving further information about assessment and/or RPL.
ASSESSMENT EVIDENCE

Complete the following grid for each grouping of NOS, assessment unit or other component as listed in the entry on the structure of the qualification on page 1.

Job Role   Network Administrator, Network Designer, Network Support Provider, Network Suppport Engineer, Technical Call Executive.

Title of Unit/Component:

(Detailed Curriculum attached As Annexure-III)

Assessable Outcomes	Assessment criteria for the outcome	Total Marks	Written	Practical	Vivo-voce
1. Explain Computer Fundamental & Word Processing.	Follow the platform for Computer Awareness	**100**	10	5	5
	Obtaining Skills for Operating System		10	5	5
	Learn Document Preparation skill		20	30	10
		Total	**40**	**40**	**20**
2. Demonstrate Advanced Electronic Circuits	Earning fundamentals of Electronics components of Computer	**50**	5	5	2.5
	Getting Information about Circuits		8	5	2.5
	Obtaining knowledge about memory and tools used for maintenance		7	5	5
		Total	**20**	**20**	**10**
3. Design and Development of Computer Architecture & Microprocessor	Learn hardware components of Computer	**50**	5	5	3
	Obtaining Basic Information Regarding Monitor		5	5	3

5

	Gaining Skills about PC drivers		5	5	3
	Learn how to operate and execute Microprocessors & Pentium Processor		5	5	3
		Total	**20**	**20**	**10**
3 Design, Install, Configure, manage troubleshooting a Computer Network	Learn how Ethernet and Internet work		5	5	5
	Follow IP Addressing Skill set		10	10	10
	Basic Configuration of routers and Switches	**250**	5	5	5
	Obtaining Advance Router Configuration Skills		10	10	5
	Learning Routing Fundamental		5	5	5
	Apply Advance Concepts of Routing		10	10	7.5
	Skill for Advanced Network Concepts		10	10	7.5
	Learn and apply Layer 2 Switching		5	5	2.5

	Follow Advanced Switching concepts		10	10	7.5
	Learning Network Address Translation (NAT) and Security		10	10	7.5
	Learn how Wide Area Networks work		10	10	7.5
	Total		**90**	**90**	**70**
4 Implement Client Server Network using Windows Server 2012 Operating System.	Learn Basic Window Client Skills	**250**	7.5	7.5	5
	Deploy and Manage Windows Server 2012 Roles and features		7.5	7.5	5
	Implement Domain Controllers and Active Directory Services.		15	15	10
	Implement Group Policy, Account policy and Security		15	15	10
	Manage and Monitor Windows Server 2012		7.5	7.5	10
	Learn File and disk Encryption and Audit policies		15	15	10
	Gathering detailed about various types of Server Configurations and VPNs in Windows 2012 Server		15	15	10
	Follow Virtualization in Windows 2012 Server		7.5	7.5	10
	Total		**90**	**90**	**70**
5. Develop skills to implement Client Server Network using Linux Operating System	Learn Basic Linux Skills	**250**	7.5	7.5	10
	Gathering Skills on User and Group Management		7.5	7.5	10
	Follow File System Concepts and Management		15	15	10
	Apply Software, Processes and Scheduling Management		15	15	10
	Apply Networking and Security in Linux		15	15	10
	Installation, Run Levels and other Advance Concepts in Linux		15	15	10
	Detailed knowledge about various Server Configurations		15	15	10
	Total		**90**	**90**	**70**
6 Enhancing Communication Skill	Develop Communication Skills	**50**	**0**	**0**	10
	Managing career, staff and professional relationships		**0**	**0**	20
	Preparing for interview		**0**	**0**	20
	Total		**0**	**0**	**50**
	Grand Total	**1000**	**350**	**350**	**300**

Means of assessment 1

Proctored online assessments (LAN and Web based), carried out using a variety of question formats applicable for linear / adaptive methodologies; performance criteria being assessed via situation judgement tests, simulations, code writing, psychometrics and multiple choice questions etc.

SECTION 2
SUMMARY EVIDENCE OF LEVEL

Level of qualification: 6

Summary of Direct Evidence:

Justify the NSQF level allocated to QP by building upon five descriptors of NSQF. Explain the reasons for allocating the level to the QP.

Generic NOS is/are linked to the overall authority attached to the job role.

Network Specialist					
Process required	**Professional knowledge**	**Professional skill**	**Core skill**	**Responsibility**	**Level**
Network Specialists understand requirements of client and help him take important business decisions based on requirements. After freezing requirements, Network Specialist proposes Abstract model of Network Solution to client. Network Specialists acquire varied theoretical and practical skills in order to Install , Configure, Manage / Maintain and troubleshoot Network Solution provided by them.	After acquiring professional knowledge on plethora of subjects, which comprise of Word processing, basic Computer Hardware Skills, Designing, Installing Configuring, Managing /Maintaining and Troubleshooting networks, Windows Server 2012 and Linux Operating System. Network Specialist will be able to carve a niche for themselves in the field of Computer Networking. They prepare detailed design of the proposed Network Solution and implement the same as well at respective Client/Vendor premises.	They are proficient in developing a detailed design solution based on theoretical and practical knowledge gained during course. They Design a Network, Install, Configure, Manage /Maintain and Troubleshoot Computer network.	Network Specialists acquire skills of both managerial and technical level and interact with different stakeholders like vendors, clients and users. They independently propose solution and cater to all the activities regarding Solution's implementation .Starting from Installation , Configuration, Management and troubleshooting a Network,they form an inherent part of the project.	They are able to lead team as well as work in team.	6
7	5	6	9	6	

SECTION 3
EVIDENCE OF NEED

What evidence is there that the qualification is needed?

Network administrators install, support and manage the networks and computer systems that keep information flowing. They implement and maintain network hardware and software, troubleshoot network problems, and ensure network security, availability & performance standards.

In challenging economic times, organizations retain and hire new network administrators to optimize existing systems to reduce costs and increase productivity. In a strong economy, companies implement new networking and communications technologies to spur a competitive advantage, leading to increased demand for trained and certified network administrators to install, secure and optimize the new systems. This consistent demand for network administrators, independent of economic conditions, has led some leading employment experts to dub network administrator a "recession proof career."

Evidences regarding qualification needed for achieving jobs in the field of networking :

1. **(Source:** *http://www.networkcomputing.com/careers/2015-it-jobs-outlook-it-pros-demand/1302556675)*

2015 IT Jobs Outlook: IT Pros In Demand

The job prospects for IT professionals are good this year (2016), if a recent survey is any indication. The poll showed that many organizations want to hire more technical workers, but expect to have a hard time filling IT positions.

General IT skills appear to be in the most demand. Organizations polled by CompTIA said they expect to hire more IT support and service workers this year. However, others skills they're looking for are application development, network engineering, as well as expertise in cloud computing, information security, and analytics.

Segmentation of Types of Positions or Skills IT Companies Expect to Pursue in 2015 by Firm Size

Types of positions or skills IT companies plan to pursue in 2015	Micro IT Firms	Small IT Firms	Medium IT Firms	Large IT Firms
Technicians or IT support/service	44%	45%	43%	51%
Application developers	27%	53%	51%	45%
Cloud expertise	17%	30%	38%	41%
Security expertise	17%	22%	32%	33%
Network engineers	14%	29%	19%	31%
Data / analytics expertise	10%	21%	28%	31%
Project managers	9%	25%	30%	26%
Consultative sales staff	17%	28%	23%	12%
Inside sales staff	17%	21%	10%	6%
None of the above	24%	3%	3%	4%

CompTIA   Source: CompTIA 2015 IT Industry Outlook

Arrows marked depict the specific 3 areas where Network Specialist could fit in.

In its report, CompTIA cited data from Burning Glass Technologies Labor Insights, which showed that U.S. businesses posted job notices for about 600,000 IT positions in the fourth quarter of last year. That's in addition to the estimated 116,000 new IT jobs that were added in the U.S. last year, the report said.

The IT employment findings are part of CompTIA's overall **IT Industry Outlook 2015** report.

2. *(Source: http://www.toptenreviews.com/software/education/best-computer-careers/network-administrator-review/)*

Network Administrator Review

OVERALL RATING

7.95/10

RANKING

6th in Computer Careers

PROS / This is a hands-on job involves collaboration with many other IT professionals.

CONS / Certification is required for network administrators.

VERDICT / Choose this career if you enjoy working with both hardware and software.

A network administrator manages both the physical and virtual aspects of an organization's computer network. The job is one of many computer careers that provide opportunities for growth and career advancement.

3. (Source: *http://www.itcareerfinder.com/brain-food/blog/entry/best-computer-jobs-for-the-future.html*)

Network Administrator Employment Projections | 2010 - 2020

- **10-Year Growth Pct:** 28% (much faster than avg.)†
- **10-Year Growth Volume:** 96,600 new jobs
- **Average Salary:** $69,000

Network Administrator Career Path
- The U.S. Dept. of Labor forecasts network administrator employment to explode by 28% from 2010 to 2020, much faster than the average for all occupations. With demand at an all-time high, it's an ideal time to begin or advance your network administration career. Universities, colleges and private computer schools offer a range of network administrator training and degree programs.

Key Growth Factors: Demand for network administrators will continue to rise as organizations invest in new systems and network technologies to increase productivity and gain a competitive advantage. The rapid adoption of tablets and smartphones – and "Bring your own device" (BYOD) policies – into corporate culture means more organizations will use the Internet to conduct business online, translating to increased job opportunities for network administrators and network managers who can help businesses securely utilize these emerging technologies to communicate with employees and customers.

What is the estimated uptake of this qualification and what is the basis of this estimate?

Student uptake from Industry

What steps were taken to ensure that the qualification(s) does/do not duplicate already existing or planned qualifications in the NSQF?
 The Qualification does not exist as per information available in public domain.
Further in this regard 70% of the syllabus is taken from the existing courses.

What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated?
The Qualification is to be monitored and reviewed every two years.
The following data will be used
1. Results of assessments
2. Employer feedback regarding student skill after conducting a placement drive

3. Employer feedback will be sought post-placement
4. Student feedbacks
5. Workshops and seminar for reviewing the qualifications
6. Consultation/ Tie-up with Industries or Expert for review of the Curriculum so as to meet the changing pace of technology and Industry requirements.

Please attach any documents giving further information about any of the topics above.
NIL

SECTION 4

EVIDENCE OF RECOGNITION OR PROGRESSION

What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?

This qualification comprises both technical and analytic skills and can be linked to any qualification higher than this one, existing or to come.

1. Source: http://www.itcareerfinder.com/it-careers/network-administrator.html

Opportunity for network Administrators to venture into cloud computing

Fundamental skills and courses to look for in a network administration degree program include systems administration training, LAN & WAN installation & configuration, routing & switching, and network security training. A networking degree that includes certifications will help you graduate with a distinct competitive advantage. Effective communication skills are also key, as network administrators communicate complex ideas and solutions to both technical and non-technical employees. Computer networking is a rich and vast domain, so beyond the basics, choose a degree with the courses that spark your interest, or those featuring networking skills that are hot right now, e.g., virtualization or cloud computing.

2. Source: https://blogs.intel.com/evangelists/2016/02/03/advice-to-a-network-admin-seeking-a-career-in-cybersecurity/

Avenues for Network Administrators to build a career in the field of Cyber security

The market is hungry for talent and network administration is a great background for several areas of cyber security.

Depending on what you want to do, you can travel down several different paths. If you want to stay in the networking aspects, I would recommend either a certification from SANS (or other reputable training organization with recognizable certifications) or dive into becoming a certified expert for a particular firewall/gateway/VPN product (ex. PaloAlto, CISCO, Check Point, Intel/McAfee, etc.). The former will give you the necessary network security credentials to work on architecture, configuration, analysis, operations, policy generation, audit, and incident response. The latter are in very high demand and specialize in the deployment, configuration, operation, and maintenance of these specific products. If you

Please attach any documents giving further information about any of the topics above.

EVIDENCE OF INTERNATIONAL COMPARABILITY

List any comparisons, which have been established.

Suitable option to pursue Post Graduation degree in the field of Computer Networks

1. Master of Computer Networking

London Graduate School of Management

This is a technical course, intended for those who wish to extend their existing knowledge of computer networks. It is ideally suited to those who wish to pursue a career in the development and deployment of practical network systems. Throughout the course, a networking approach is taught, and students will be expected to carefully plan, design, assess alternatives before implementing, and evaluate networks. Project management, team working, skills associated with group dynamics are developed throughout the course. Subjects studied include: Physical Networking, Network and Server Administration, Java Programming, Network Security, Network Programming, Remote Access and Network Applications, Routing and Switching, Distributed Systems, Practical Networking, Wide Area Networking, Mobile Computing, Project Management, Wireless LANs, Research Methodologies, UNIX/ Linux.

Source: http://www.masterstudies.com/Master-of-Computer-Networking/UK/London-Graduate-School-of-Management/

2. Networking and System Administration MS

Program Overview

Trends in network communications–unifying wired and wireless infrastructures, Cloud computing, scalability, collaboration tools, and security–can only be coalesced into reliable communication services if there are highly educated and technically proficient networking and system administration professionals who understand both traditional and emerging communication technologies as well as how to apply these technologies to organizational needs and opportunities.

The explosion in ubiquitous computing today means an increased need for greater efficiency and for better management oversight in the provision of IT services. Network environments are not only becoming increasingly complex, there is a greater recognition of the power of information technology to be a strategic enabler of corporate growth and adaptation.

The Master of Science program in networking and system administration is designed to provide both the knowledge and the technical skills needed to successfully compete in this environment. It is uniquely focused to address current issues in networking and systems administration through investigation of both the theoretical and the practical aspects of this continually evolving field.

Course work examines the organizational and technological issues involved in enterprise scale networking, including emerging network technologies, network processing, high performance computing, network programming, and security.

Source:https://www.rit.edu/programs/networking-and-system-administration-ms