

COMPLEX NOUN PHRASES IN THE LANGUAGE OF COMPUTER TECHNOLOGY

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Abstract

As the world of Computers and Information Technology is expanding, new realities of language production are becoming apparent. The complexity of nominal phrases is particularly interesting as ICT language is fostering an environment characterized by the stringent need for expressiveness paired with the brevity needed in this engineering field. The nominal structures resulting from reference to gadgets and computer technology are often intricate and contain multi-layered relations between components. The observed trend of the NPs to increase in syntactic complexity in order to convey elaborate meanings is what has aroused our interest. The aim of the current research is to classify and analyse the syntactic specificity of the Noun Phrases in the linguistic output pertaining to computer technology by investigating concrete manifestations and occurrences in a corpus of articles heralding new technologies in online technology magazines

Keywords: complex noun phrase, corpus study, ICT language, nominal groups, syntactic composition, technology magazines

1. Introduction

To the untrained eye, a nominal group and a complex noun phrase may represent one and the same thing, i.e. clusters of words centered around a nominal head that include additional, detailed information by means of premodifiers (adjectives, nouns) or postmodifiers (prepositional phrases, relative clauses). Nonetheless, literature cites major distinctions between the **functional notion** of a **nominal group** and the **formal notion** of a **noun phrase** that will be set under scrutiny. First distinguished by Halliday (1964) and further refined by other linguists, there is a theoretical distinction between the terms *group* and *phrase*. Halliday argues that "a

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phrase is different from a group in that, whereas a group is an expansion of a word, a phrase is a contraction of a clause" (Halliday& Matthiessen, 2004:311). Moreover, the term 'nominal' present in '**nominal group**' refers to a wider class of syntactic occurrences than the term **noun**. (Halliday& Matthiessen, 2004:320). As opposed to nominal groups, the noun phrases often occurring in the language used in technology magazines are often sophisticated structures that include additional nominal heads in the form of nouns, or a descriptive range of adjectives, adverbs, numerals and determiners associated with the entity under description. These provide a multitude of additional features to the entity mentioned as the structural **head**, as well as to the embedded head(s). As noticed by Popa (2025:231), complex noun phrases in ICT reviews, "while possibly seeming excessive, they contribute to the informative function of the text and its profession of objectivity and professionalism".

2. The structure of Complex Noun Phrases

Complex noun phrases are particularly abundant in the language of Information technology to convey intricate, condensed expressiveness and enhance the rendering of meaning with maximum precision. In other words, the entity under description is accompanied by carefully curated sets of features, capabilities and data in premodified and/ or postmodified position.

Complex noun Phrases consist of:

- **A structural nominal Head:** The **meaning-carrying noun** (or pronoun) that is vital to rendering the entity under description;
- **Additional head** embedded in the pre-or post-modifying structure
- **Determiners and Premodifiers:** descriptive words placed before the head (articles, other nouns, adjectives, participles).
- **Postmodifiers:** Information placed after the head (prepositional phrases, relative clauses)

While determiners, premodifiers and postmodifiers are optional elements, they largely contribute to the added complexity in meaning. The structure of the complex noun phrase can be summarised as follows and



has been illustrated with examples selected from information technology magazines¹:

1.determiner	2.premodifiers +embedded head	3.structural head noun	4.postmodifiers + embedded head
the	top storage	titans	
an	all-time	high	
	pay-as-you-grow	models	
all	major public	clouds	
their	broader digital services	ecosystem	
the		demand	for high-velocity, low-latency infrastructure
the	cloud-native	dominance	of Amazon S3
a		shift	toward intent-driven storage
this	simulation-first	methodology	

As noticed in the examples above, there are various levels of embedding within the complex noun phrase in the sense that postmodifiers in the form of relatives introduce a secondary nominal head that is also pre-modified. The resulting construction consists of a first-level NP and a secondary- level complex phrase. The resulting conglomerate renders the meaning of both nominal heads with their additional properties and plays upon the dynamic shift of focus from one head to the other.

We may notice the existence of several different types of postmodifying structures, including either or both **clauses** and **phrases**. Clausal postmodifiers can be either finite or non-finite. When finite, they emerge as a relative clause and expand into a set of information that defines the head more prominently and accurately than a non-finite postmodifier.

Example 1:

[...] high-performance disk and all-flash arrays **that prioritise reliability**²

¹ Examples retrieved from <https://technologymagazine.com/news/top-10-enterprise-storage-solutions>, <https://technologymagazine.com/news/how-nvidia-vera-rubin-dsx-redefines-ai-infrastructure-design>, February 27th 2026

² Example from <https://technologymagazine.com/news/top-10-enterprise-storage-solutions>, retrieved February 23rd 2026



Additionally, the non-finite version might tilt towards the prolix, hindering interpretation. Compare with:

=high-performance disk and all-flash arrays **prioritizing reliability**
-nonfinite clause postmodifier

with prioritized reliability-prepositional phrase postmodifier

Example 2

highly scalable solutions **that integrate well** with their broader digital services ecosystem³

=highly scalable solutions **integrating well** with their broader digital services ecosystem

with good integration

Non-finite postmodifiers may occur as part of nominal groups as to-infinitive, verb-ing, and verb-ed and display the features mention by the postmodifier with lower prominence and focus from a syntactic viewpoint, but save time and space due to the ellipsis of unnecessary linking words. They may refer to:

A) Purpose/ Direction: AI **increased revenue**= revenue that could increase with the help of AI,

the foundation **to build the world's most productive AI factories**= upon which to build

a unified control plane **for facility managed endpoints**= endpoints managed on facility grounds

B) An expressive feature: enterprises **requiring high-performance, fully managed NFS storage**, high-performance disk and all-flash arrays **prioritising reliability**⁴.

Phrasal postmodifiers may occur as two main types: prepositional phrases and appositive noun phrases.

Examples⁵:

a cohesive single pane **of glass management experience**

the carbon footprint **in large-scale data centres**

³ Example from <https://technologymagazine.com/news/top-10-enterprise-storage-solutions>, retrieved February 23rd 2026

⁴ Examples from <https://technologymagazine.com/news/top-10-enterprise-storage-solutions>, retrieved February 23rd 2026

⁵ Examples from <https://technologymagazine.com/news/top-10-enterprise-storage-solutions>, retrieved February 23rd 2026



a unified control plane **for facility management**

DSX Flex introduces another layer of sophistication **in linking AI facilities to power grid services**⁶

real-time adjustment **of workloads and infrastructure.**

[...] dynamic adjustment **of energy consumption** and coordination **with hybrid onsite generation**

Appositive NPs

Examples:

At the heart of this transformation lies the Vera Rubin DSX AI Factory reference design, **a co-designed infrastructure that treats compute, power and cooling as integrated components rather than separate systems.**⁷

Hitachi Vantara has simplified its portfolio with VSP One, **a unified data platform designed to eliminate silos across block, file and object storage**⁸.

Some adverbs can also act as premodifiers or postmodifiers in a complex noun phrase:

[...] with energy efficiency features **prominently** in the architecture⁹=
prominently present in the architecture

3. Noun + noun sequences

Noun + noun combinations are particularly abundant in technology descriptions and consist only of content words, with no function word to show the semantic relationship between the two components. The pair conveys various relationships of meaning between their nominal components that are visible despite the lack of function words to indicate relation. They rely heavily and densely on implicit meaning, because the reader must infer the intended logical relationship between the modifying

⁶ Example from <https://technologymagazine.com/news/how-nvidia-vera-rubin-dsx-redefines-ai-infrastructure-design> March 15th 2026

⁷ Example from <https://technologymagazine.com/news/how-nvidia-vera-rubin-dsx-redefines-ai-infrastructure-design> March 15th 2026

⁸ Example from <https://technologymagazine.com/news/top-10-enterprise-storage-solutions>, retrieved February 23rd 2026

⁹ Example from <https://technologymagazine.com/news/how-nvidia-vera-rubin-dsx-redefines-ai-infrastructure-design>, retrieved March 20th 2026



noun and head noun. In fact, noun + noun sequences are used to convey a surprisingly wide range of semantic and logical relations in which the modifying noun sits in frontal position, while the head occupies secondary stance. The relationships of meaning have been categorised¹⁰ as follows:

1. **composition**-modifying noun makes reference to the material composition of the head noun:

E.g. LED display= display made of Light emitting diodes, metal casing, LCD screen, cathode tube;

2. **purpose** – head noun shows purpose of entity named by modifier:

E.g. laptop case = case used for laptops, storage device= device used for storage, research procedure, programming language;

3. **identity**- the head has the same referent as **modifier** but classifies it in terms of different attributes:

E.g. women programmers = women who are programmers, junior developers= developers who are beginners, quality assurance technician= technician that assures quality, front-end/ back-end developer= developer that deals with front-end/back end programming interface, consultant technician, council member, etc.

4. **content** – head noun is about modifier; head deals with modifier:

E.g. program text = the text is used by/describes the program, eligibility profile = profile indicating level of eligibility, server malfunction, sound/video card, data resilience, data sheets, satellites network, CPU capability, computer users, AI training, media rendering , genomic sequencing;

5. **objective**- modifier is the object of the process described by head noun, or of the action accomplished by the agent described in head:

E.g. hardware production = X produces hardware components, waste disposal company= company has the objective to dispose of waste, software development, cache cleanup;

6. **subjective** – modifier is the subject of the process described in head; head generally represents a nominalization of an intransitive verb:

E.g. skills development = skills are developed in a process, work flow= work is made to flow, code refinement, eye movement, data computation;

¹⁰ In Biber, D., Conrad, S., Leech, G.,(2002: 273) with examples selected from <https://technologymagazine.com> ;



7. **time-** head is found or takes place at the time or with the frequency specified by modifier:

E.g. morning meetings = meetings that occur during the morning, Monday debrief, annual dividends, quarterly assessment;

8. **location-** head is found or takes place at the location specified by modifier:

E.g. corner office = an office that is located in the corner, Paris conference; desktop computer, laptop computer;

9. **institution** -head noun identifies an institution for modifier:

E.g. software companies = companies for creating software, programmers club, robotics division;

10. **partitive** (head noun identifies parts of modifier):

E.g. computer components = components that are part of the computer, team member, board directors;

11. **specialization** (modifier pinpoints an area of specialization for the person or occupation specified by head; head is often animate):

E.g. quality assurance officer = officer who specializes in quality assurance, Java consultant, executive officer, health chatbots;

12. **source** – modifier indicates what the head noun stems from:

E.g. cloud native features=features can be found in cloud, printer output= the source of the output is the printer, voice command= command is given via voice etc.

4. Noun phrases with multiple premodifiers

Particularly in written registers, noun phrases occur with multiple premodifiers in order to enhance semantic content with extreme brevity. Nonetheless, it is not always the case for all the words in the premodified sequence to refer to one single head noun. Instead, premodifying sequences usually display sets of embedded relationships, in which some words modify other premodifiers (embedded heads on their own in their sequence) instead of the central head noun. In some cases, the meaning relationships among constituents are truly ambiguous.



Let us consider the following noun phrase occurrence¹¹:

Example: Its robust ecosystem – featuring automated Intelligent-Tiering and advanced security – provides the primary benchmark for **scalable, secure and cost-effective enterprise data [lakes]**.¹²

a) storage of enterprise data (company data)displaying the feature of being scalable, secure and cost effective

or

b) repositories of data (data is general, not company specific) designed for enterprise use, displaying the feature of being scalable, secure and cost effective.

Other noun phrases illustrate different relationships among the constituents, as in the following noun phrases with three-word premodification:

a [[one-time prosperous] [[software] company]]

the [[highly debated] [software investment] portfolios]

The number of possible meaning increases with each additional premodifier. Thus, noun phrases with multi-word premodification can represent many different semantic relationships among its constituents. For example, the following noun phrases with four-word premodification display different relations of meaning despite their similar syntax:

1 [[company-driven], [direct], [resource] **exploitation**]

2 [[very] [finely grained]] [user] **interface**]

3. [its] [proprietary] [transaction] **foundation**] **model**]¹³

In 1, 2, all the words in the premodification sequence directly modify the head noun. This type of structuring is very rare, however. As 3 illustrates, however, the multiple words in the premodification sequence

¹¹ <https://technologymagazine.com/news/top-10-enterprise-storage-solutions> ,retrieved February 23rd 2026

¹²

<https://technologymagazine.com/news/how-nvidia-vera-rubin-dsx-redefines-ai-infrastructure-design>, retrieved March 20th 2026

¹³

<https://technologymagazine.com/news/this-weeks-top-5-stories-in-technology-20-03-2026>, retrieved March 19th 2026



display a more complex structural relationship among themselves, making the interpretation of the NP more time-consuming.

5. The order of multiple premodifiers

In spite of the existence of definite rules, we can make reference to a set of general tendencies governing the order of premodifiers in a nominal sequence:

a) Adverbs almost always stand before adjectives. This is because adverbs usually modify

the subsequent adjective rather than the head noun directly.

Examples: a generically used AI tool

highly scalable solutions¹⁴

b) If a noun phrase displays both an adjective and a noun as premodifiers, the adjective usually precedes the noun. This sequence occurs most commonly since the position closest to the head noun is filled by modifiers that are more integrated with the meaning of the head noun. The following noun phrases illustrate these occurrences :

- **adjective + noun + head:**

Examples: mature AI platform, an intuitive user experience, structured data convergence

- **color reference adjective + noun + head:**

Examples: white hat hackers, glass management experience, gold metal casing, silver display screen

- **participial adjective + noun + head:**

Examples: an experienced senior programmer, integrated energy systems, automated intelligence tiering

Nonetheless, this rule of word order can sometimes be reversed, especially with participial adjectives, if the premodifying noun modifies the participial adjective (rather than the head noun): **noun + participial adjective + head noun:**

[data processing] computation, [hypothesis testing] process, [market valued] asset

¹⁴ <https://technologymagazine.com/news/top-10-enterprise-storage-solutions>, retrieved February 23rd 2026



In most cases, sequences consisting of premodifiers are hyphenated and are often analysed as adjectival compounds:

E.g. cloud-to-edge synchronization technique, low-latency access, consumer-based experience, cloud-like agility, real-time analytics¹⁵

An important principle in ordering multiple adjectives as premodifiers is that **descriptors** tend to precede **classifiers**:

a [strongly unified]1 [operating]2 system=1 descriptor, 2 classifier
[production-ready]1 [global]1 [cloud]2 networks= 1, 1 classifier, 2 descriptor

6. Conclusions

As the world of Information Technology expands to higher levels of complexity, so does the language associated with these newly-emerging realities. For linguists, the manifestations of ICT language constitute an ever-growing pool of wonder and a starting point for analysis and scrutiny due to the creative and complex means by which this domain of engineering encodes meaning. The syntactic patterns of linguistic occurrences in this field have revealed large areas of predictability as well as some areas of ambiguity both of which have been tackled above and can represent a trigger for further research.

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Online resources

<https://technologymagazine.com>